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ABSTRACT

This proceedings includes the following papers: "Examining Learning Styles of Students in College of Agriculture" (Torres, Cano); "Developing a Scale to Research and Evaluate Youth Leadership Life Skills Development" (Seevers, Dormody, Clason); "Predicting Youth Leadership Life Skills Development among FFA (Future Farmers of America) Members in Arizona, Colorado, and New Mexico" and "Predicting Youth Leadership Life Skills Development among Senior 4-H Members" (Dormody, Seevers); "Understanding and Perceptions about Agriculture of Television News Reporters" (Terry, Jr.); "Strategies for Improving Agricultural Literacy and Science Process Skills of Urban Fifth and Sixth Graders in Los Angeles Unified School District" (Mabie, Baker); "Agricultural Awareness in Arizona" (Flood, Elliot); "Realistic Expectations of Beginning Secondary Agriculture Education Teachers as Perceived by Beginning Secondary Agriculture Education Teachers and Their Principals in the Western United States" (Mundt et al.); "Assessment of Cognitive Level of Instruction, Aspiration, and Attitude toward Higher Level Instruction" (Whittington, Bowman); "Agri-Science Equal to Science?" (Christian, Key); "Status of Secondary Agricultural Education Computers and Agribusiness Software" (Elliot et al.); "How Videotape Is Used by Teachers of Agricultural Sciences in Secondary Schools" (Daniel, Terry, Jr.); "4-H Youth Participation in Leadership Development Activities" (Seevers, Dormody); "Participation of FFA Members in Arizona, Colorado, and New Mexico in Leadership Development Activities" (Dormody, Seevers); "Administrative Approaches to Management of Concurrent Enrollment Programs" (Hirpa, Straquadine); "Analysis of the Leadership Styles of Selected FFA

Members and Their Advisors" (Washington et al.); "Learning and Teaching Styles of Agricultural and Technology Education Teacher Educators and Preservice Teachers" (Raven et al.); "Comparison of Learning Styles, Teaching Styles and Personality Types of Preservice Student Teachers at Two Western Universities" (Whittington, Raven); "Agricultural Education Preparation Programs in the Western Region" (Cvancara, Nelson); "Comparison of Undergraduate Major and Preservice Teachers' Performance on a Standardized Subject Assessment Exam; and Technical Competence as Perceived by Cooperating Teachers" (Baker, Malle); "Homeowners' Attitudes about the Use of Lawn Chemicals" (Byrum, Elliot); "Enrollment Changes in Idaho Agricultural Sciences and Technology Programs Which Occurred after Program Delivery Changes" (Mundt, Nesbitt); "Agricultural Mechanics Laboratory Safety" (Lawver); and "Relationships between Student Safety Attitude and Selected Variables" (Lawver). Critiques follow each paper. (MN)

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With Agriculture Knowledge and Wisdom

(Me Ka Ike Ame Ka Na'auao)

Proceedings of the Thirteenth Annual

Western Region Agricultural Education Research Meeting

April 13-16, 1994
Honolulu, Hawaii

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With Agriculture Knowledge and Wisdom

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Proceedings of the Thirteenth Annual

Western Region Agricultural Education Research Meeting

Volume XIII, Number 1

Editors:

David E. Cox
and
Frank C. Walton

April 13-16, 1994
Honolulu, Hawaii

FOREWORD

As agricultural education professionals meet for the Thirteenth Annual Western Region Agricultural Education Research Meeting agricultural education is forging ahead into the mid 1990s. Research continues to play a major part in the all aspects of agricultural education.

Research conducted by agricultural education professionals provides important information for agricultural education at the elementary, secondary, and post-secondary school levels as well as the agricultural literacy and knowledge of the general public. For 13 years, agricultural educators from the Western Region of the American Association for Agricultural Education have presented their findings for the benefit of the profession.

A total of thirty-five papers was submitted for review. This was a 25% increase over last year. Each of the 35 papers was distributed to three independent reviewers using a blind review process. Two reviewers represented the Western Region and 19 reviewers were from other AAAE regions. The reviewers rated each paper on the quality of research and its importance to the agricultural education profession. Based upon the reviewers' recommendations, 24 papers were selected for presentation at the research meeting, resulting in an acceptance rate of 69%.

Sincere thanks is extended to the reviewers, session chairs, discussants and facilitators for the research meeting. Without their help and assistance this research meeting could not have been conducted. Special appreciation is extended to Dr. James J. Connors for his hard work and dedication. Finally special thanks goes to the researchers who conducted and submitted their papers for presentation at the meeting. Their hard work is greatly appreciated.

David E. Cox
Frank C. Walton
Co-Chairmen
1994 Western Region
Agricultural Education Research Meeting

TABLE OF CONTENTS

Foreword ii

Table of Contents iii

Previous Meetings and Chairpersons vii

Reviewers vii

Session Chairs viii

Discussants viii

Facilitators viii

Papers Accepted For Presentation

Examining the Learning Styles of Students in a College of Agriculture 1
Robert M. Torres, New Mexico State University
Jamie Cano, Ohio State University

Discussant Comments - Douglas A. Pals, University of Idaho 13

Developing a Scale to Research and Evaluate Youth Leadership Life Skills Development 14
Brenda S. Seevers, New Mexico State University
Thomas J. Dormody, New Mexico State University
Dennis L. Clason, New Mexico State University

Discussant Comments - Douglas A. Pals, University of Idaho 26

Predicting Youth Leadership Life Skills Development among FFA Members in Arizona, Colorado, and New Mexico 27
Thomas J. Dormody, New Mexico State University
Brenda S. Seevers, New Mexico State University

Discussant Comments - Douglas A. Pals, University of Idaho 39

Predicting Youth Leadership Life Skills Development among Senior 4-H Members in Arizona, Colorado, and New Mexico 40
Brenda S. Seevers, New Mexico State University
Thomas J. Dormody, New Mexico State University

Discussant Comments - Douglas A. Pals, University of Idaho 53

Understanding and Perceptions About Agriculture of Television News Reporters 54
Robert Terry, Jr, Texas Tech University

Discussant Comments - James P. Key, Oklahoma State University 66

Strategies for Improving Agricultural Literacy and Science Process Skills of Urban Fifth and Sixth Graders in the Los Angeles Unified School District 67
Rachel Mabie, Cal Poly - Pomona
Matt Baker, Cal Poly - Pomona

Discussant Comments - James P. Key, Oklahoma State University 80

Agricultural Awareness in Arizona 81
Robert Alan Flood, University of Arizona
Jack Elliot, University of Arizona

Discussant Comments - James P. Key, Oklahoma State University 93

Realistic Expectations of Beginning Secondary Agriculture Education Teachers as Perceived by Beginning Secondary Agriculture Teachers and their Principals in the Western United States 94
John P. Mundt, University of Idaho
Laurie Stenberg-Nichols, University of Idaho
Troy S. Wright, Agriculture Instructor - New Plymouth, Idaho

Discussant Comments - James P. Key, Oklahoma State University 107

Assessment of Cognitive Level of Instruction, Aspiration and Attitude Toward Higher Level Instruction 108
M. Susie Whittington, University of Idaho
Gretchen L. Bowman, University of Idaho

Discussant Comments - Linda Whent, University of California-Davis 120

Agri-Science Equal to Science? 121
Tony Christian, Agriculture Teacher - Norman, Oklahoma
James P. Key, Oklahoma State University

Discussant Comments - Linda Whent, University of California-Davis 131

Status of Secondary Agricultural Education Computers and Agribusiness Software . . . 132
Jack Elliot, University of Arizona
James J. Connors, University of Arizona
James Schug, Midwest Agribusiness Services, Inc.
Paula Wright, University of Arizona

Discussant Comments - Linda Whent, University of California-Davis 144

How Videotape is Used by Teachers of Agricultural Sciences in Secondary Schools . . 145
R. Bryan Daniel, Texas Tech University
Robert Terry, Jr., Texas Tech University

Discussant Comments - Linda Whent, University of California-Davis 157

4-H Youth Participation in Leadership Development Activities: A Tri-State Study 158
Brenda S. Seevers, New Mexico State University
Thomas J. Dormody, New Mexico State University

Discussant Comments - Clifford Nelson, Washington State University 170

Participation of FFA Members in Arizona, Colorado, and New Mexico in Leadership Development Activities 171
Thomas J. Dormody, New Mexico State University
Brenda S. Seevers, New Mexico State University

Discussant Comments - Clifford Nelson, Washington State University 183

Administrative Approaches to the Management of Concurrent Enrollment Programs . . 184
Haile Hirpa, Utah State University
Gary S. Straquadine, Utah State University

Discussant Comments - Clifford Nelson, Washington State University 196

An Analysis of the Leadership Styles of Selected FFA Members and Their Advisors . . 197
Darla Washington, Stephen F. Austin State University
Dale Perritt, Stephen F. Austin State University
Sandra McCune, Stephen F. Austin State University
Donice McCune, Stephen F. Austin State University

Discussant Comments - Clifford Nelson, Washington State University 210

Learning and Teaching Styles of Agricultural and Technology Education Teacher Educators and Pre-Service Teachers 211
Matt R. Raven, Montana State University
Van Shelhamer, Montana State University
Mike D. Wright, Montana State University

Discussant Comments - Vernon Luft, University of Nevada-Reno 223

A Comparison of Learning Styles, Teaching Styles and Personality Types of Preservice Student Teachers at Two Western Universities 224
M. Susie Whittington, University of Idaho
Matt Raven, Montana State University

Discussant Comments - Vernon Luft, University of Nevada-Reno 236

Agricultural Education Preparation in the Western Region 237
Joseph G. Cvancara, Washington State University
Clifford L. Nelson, Washington State University

Discussant Comments - Vernon Luft, University of Nevada-Reno 250

A Comparison of Undergraduate Major and Preservice Teachers' Performance on a Standardized Subject Assessment Exam; and Technical Competence as Perceived by Master Teachers 251
Matt Baker, Cal Poly - Pomona
Seck Malle, Cal Poly - Pomona

Discussant Comments - Vernon Luft, University of Nevada-Reno 263

Homeowners' Attitudes About the Use of Lawn Chemicals 264
William D. Byrum, Dow Chemical - Champaign Illinois
Jack Elliot, University of Arizona

Discussant Comments - James E. Christiansen, Texas A&M University 276

Enrollment Changes in Idaho Agricultural Science and Technology Programs Which Occurred After Program Delivery Changes 277
John P. Mundt, University of Idaho
Stuart D. Nesbitt, Agriculture Instructor - Weiser, Idaho

Discussant Comments - James E. Christiansen, Texas A&M University 288

Agricultural Mechanics Laboratory Safety: Student Attitudes and Perceptions 289
David E. Lawver, Texas Tech University

Discussant Comments - James E. Christiansen, Texas A&M University 301

Relationships Between Student Safety Attitude and Selected Variables 302
David E. Lawver, Texas Tech University

Discussant Comments - James E. Christiansen, Texas A&M University 314

Complete List of Papers Submitted for Consideration at the Thirteenth Annual Western Region Agricultural Education Research Meeting 315

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Previous Meetings and Chairpersons

Year	Location	Chair	University
1982	Austin, TX	Gary E. Briers	Texas A&M University
1983	Rio Rico, AZ	Phillip A. Zurbrick	University of Arizona
1984	Oklahoma City, OK	James P. Key	Oklahoma State University
		David E. Cox	Cameron University
1985	Boise, ID	John W. Slocombe	University of Idaho
1986	Las Cruces, NM	Paul R. Vaughn	New Mexico State University
1987	Logan, UT	Gilbert A. Long	Utah State University
1988	Ft. Collins, CO	Ramsey Groves	Colorado State University
1989	Sparks, NV	Joseph G. Harper	University of Nevada-Reno
1990	Fresno, CA	James G. Leising	University of California-Davis
1991	Seattle, WA	Marvin D. Kleene	Washington State University
1992	Cody, WY	Carl L. Reynolds	University of Wyoming
1993	Bozeman, MT	Van Schelhamer	Montana State University

Reviewers

Dr. R. Kirby Barrick	Ohio State University
Dr. Bob Birkenholz	University of Missouri
Dr. John R. Crankilton	Virginia Tech
Dr. Jacquelin Deeds	Mississippi State University
Dr. David L. Doerfert	Iowa State University
Dr. Arlen Etling	Pennsylvania State University
Dr. Jim Flowers	North Carolina State University
Dr. Stacy A. Gartin	West Virginia University
Dr. David E. Hall	Pennsylvania State University
Dr. Joseph G. Harper	Clemson University
Dr. David L. Howell	University of New Hampshire
Dr. Don Johnson	University of Arkansas
Dr. James Key	Oklahoma State University
Dr. James G. Leising	University of California-Davis
Dr. Alfred J. Mannebach	University of Connecticut
Dr. Robert A. Martin	Iowa State University
Dr. Michael E. Newman	Mississippi State University
Dr. Glen Shinn	Texas A&M University
Dr. Michael K. Swan	North Dakota State University
Dr. George Wardlow	University of Arkansas
Dr. Randol G. Waters	University of Tennessee

Session Chairpersons

Dr. Gilbert Long	Utah State University
Dr. Steve Fraze	Texas Tech University
Dr. James Leising	University of California-Davis
Dr. Glen M. Miller	University of Arizona
Dr. Carl L. Reynolds	University of Wyoming
Dr. Gary Straquadine	Utah State University

Discussants

Dr. Douglas A. Pals	University of Idaho
Dr. Vernon Luft	University of Nevada-Reno
Dr. Clifford Nelson	Washington State University
Dr. Linda Whent	University of California-Davis
Dr. James P. Key	Oklahoma State University
Dr. James E. Christiansen	Texas A&M University

Facilitators

Dr. James J. Connors	University of Arizona
Dr. Joseph G. Cvancara	Washington State University
Dr. Stephen E. Poe	Utah State University
Dr. M. Susie Whittington	University of Idaho
Dr. Matt Baker	Cal Poly - Pomona
Dr. Robert M. Torres	New Mexico State University

EXAMINING THE LEARNING STYLES OF STUDENTS IN A COLLEGE OF AGRICULTURE

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Assistant Professor
New Mexico State University

Jamie Cano
Associate Professor
The Ohio State University

Introduction

A number of factors that influence the educational process have emerged from research on human developmental stages and life phases. Learning style is one factor researchers claim influenced student educational performance (Dunn & Dunn, 1979; Claxton & Murrell, 1987; Garger & Guild; 1984; Saracho, 1989; Witkin, 1973). Gregorc (1979) described learning style as "consisting of distinctive behaviors which serve as indicators of how a person learns from and adapts to his/her environment. It also give clues as to how a person's mind operates" (p. 234).

Learning style research has been applied at an ever-increasing rate to the problems of education (Doebler & Eicke, 1979). Claxton and Murrell (1987) suggested that learning style could be an extremely important element in the move to improve curricula and the teaching process in higher education. Anderson and Adams (1992) indicated that more attention than ever was being focused on how to meet the challenge of increasing diversity in the classroom. Anderson and Adams (1992) argued that:

> One of the most significant challenges that university instructors face is to be tolerant and perceptive enough to recognize learning differences among their students. Many instructors do not realize that students vary in the way they process and understand information. The notion that students' cognitive skills are identical at the collegiate level [suggests] arrogance and elitism by sanctioning one groups' style of learning while discrediting the style of others (p. 19).

Field-dependent and field-independent learning styles have been widely and extensively studied and have the broadest application to educational concerns (Witkin, Dyk, Faterson, Goodenough, & Karp, 1962). Witkin, Moore, Goodenough, and Cox (1977) suggested that students who preferred a field-dependent learning style tended to perceive the world globally, found it more difficult to solve problems, were highly sensitive and attuned to the social environment, tended to favor the "spectator approach" to learning, and would adopt the organization of information to be learned. Additionally, students who preferred a field-dependent learning style were more extrinsically motivated and responsive to social reinforcement.

Conversely, students who preferred a field-independent learning style tended to view the world more analytically, found it easier to solve problems, and were more likely to favor "inquiry" and independent study. In addition, field-independent students tended to provide their own structure to facilitate learning, were more intrinsically motivated, and were generally unresponsive to social reinforcement (Witkin et al., 1977).

Currently, research on field-dependent and field-independent learning style in colleges of agriculture is limited to the efforts of a few researchers (Escombe, 1988; Cano & Garton, 1992a, 1992b; Cano, Garton, & Raven, 1991, 1992; Raven, Cano, Garton, & Shelhamer, 1993), and to a small number of graduate students and undergraduate students majoring in agricultural education. Thus, if educators in colleges of agriculture are to recognize and appreciate differences in students' learning style and meet the challenge set forth by Anderson and Adams (1992), an expansion of this research area is essential.

Purpose and Research Questions

The purpose of this study was to determine the preferred learning style of students enrolled in the College of Agriculture at The Ohio State University. The following specific research questions were examined.

1. What was the preferred learning style of students enrolled in the College of Agriculture by gender as measured by the Group Embedded Figures Test?
2. What was the preferred learning style of students enrolled in the College of Agriculture by academic major as measured by the Group Embedded Figures Test?
3. What was the overall preferred learning style of students enrolled in the College of Agriculture as measured by the Group Embedded Figures Test?

Methods/Procedures

The accessible population for the descriptive study was senior students enrolled in the College of Agriculture at The Ohio State University during the Autumn Quarter, 1992 (N=388). An up-to-date list of seniors was obtained from the College Office and served as the frame for the study. A sample of 196 students was randomly drawn from the population of senior students. The sample size (n=196) was determined using Krejcie and Morgan's (1970) table of sample sizes, specifying a five percent margin of error.

The Group Embedded Figures Test (GEFT; Witkin, Oltman, Raskin, & Karp, 1971) was used to assess the preferred learning style of students, as either field-dependent or field-independent. Individuals scoring greater that the national mean (11.4) were considered to be leaning toward the field-independent learning style, while subjects scoring less than the national mean were considered to be leaning toward the field-dependent learning style (Witkin et al., 1971). The total possible raw score on the GEFT was 18.

The validity of the GEFT has been established by determining its relationship with its "parent" test, Embedded Figures Test (EFT), as well as the Rod and Frame Test (RFT), and the Body Adjustment Test (BAT) (Witkin et al., 1971). Because the GEFT was a speed test, internal consistency was measured by treating each scored section (sections two and three) as split-halves. Witkin et al. (1971) reported a corrected Spearman-Brown reliability coefficient of .82 on the GEFT.

Data collection was initiated by mailing students a letter of invitation strongly encouraging participation in the study. The letter was structured according to Dillman (1978) and specified four dates and times with two data collection sessions on each date. Students were invited to attend one of the eight sessions offered. Students were able to indicate their willingness to participate on a self-addressed, stamped postcard. Ten days after the initial mailing, follow-up efforts were conducted via telephone to determine students' willingness to participate in the study. A make-up data collection session was offered to students unable to attend their scheduled session. All data collection sessions were located in the same room.

A total of 47 percent (n=92) of the students in the sample participated in one of the eight scheduled or one make-up data collection sessions. Students who did not participate in the study were treated as non-respondents and considered to be non-response error.

Non-response error was controlled by sampling the non-respondents and comparing them with the respondents. A sample of 10 percent of the non-respondents (n=92) were compared on variables of interest as was suggested by Miller and Smith (1983). No significant differences ($p<.05$) were found between the sample of non-respondents and respondents. Thus, the non-respondent data were pooled with the respondent data, yielding a sample size of 103 (53.0%) and allowing generalization to the sample/population (Miller & Smith, 1983).

Analysis of Data

The data were analyzed using SPSS/PC+. Descriptive statistics such as frequencies, percentages, central tendencies, variance, and ranges were used to represent the data.

Results

The Group Embedded Figures Test (GEFT; Witkin et al., 1971) was used to gather data on the preferred learning styles of senior students enrolled in the College of Agriculture at The Ohio State University during the Autumn Quarter, 1992. The preferred learning style of senior students were dichotomized as either field-dependent or field-independent.

A gender analysis (Table 1) indicated that 28.8 percent of the males leaned toward the field-dependent learning style, while a majority (71.2%) of the males leaned toward a field-independent learning style. Among females, approximately 50 percent leaned toward both field-dependent field-independent learning styles. The raw GEFT scores ranged from 1 to 18 for males and 2 to 18 for females (Table 2). The raw mean GEFT score for males was 13.4. The average raw GEFT score for females was 11.1.

An analysis of the overall GEFT scores (Table 1) indicated that 38.8 percent of the senior students leaned toward a field-dependent learning style. Conversely, 61.2 percent of the senior students leaned toward the field-independent learning style. The raw mean GEFT score for senior students was 12.4 (Table 2). The raw GEFT scores for senior students ranged from 1 to 18.

Table 1

Preferred Learning Style by Gender (n=103)

	GEFT			
	Field-Dependence		Field-Independence	
Gender	Freq.	%	Freq.	%
Male	17	28.8	42	71.2
Females	23	52.3	21	47.7
Total	40	38.8	64	61.2

Table 2

Mean Preferred Learning Score by Gender (n=103)

Gender	n	Mean	SD	Range
Male	59	13.4	3.75	1-18
Female	44	11.1	4.62	2-18
Overall	103	12.4	4.27	1-18

Note. Raw scores are based on a maximum possible score of 18

An analysis, using frequencies, percentages (Table 3), means, standard deviation, and ranges (Table 4) of students' preferred learning style by nine academic majors (Animal Science, Agricultural Economics, Horticulture, Agricultural Education, Food Science, Dairy Science, Agronomy, Agricultural Mechanics) in the College of Agriculture revealed that of the 27 senior students majoring in Animal Science, 29.4 percent leaned toward the field-dependent learning style and 70.4 percent leaned toward the field-independent learning style. The raw GEFT scores ranged form 2 to 18 with a raw mean GEFT score of 13.1.

Table 3

Preferred Learning Style by Academic Major (n=103)

	GEFT			
	Field-Dependence		Field-Independence	
Gender	Freq.	%	Freq.	%
Animal Science	8	29.6	19	70.4
Agricultural Economics	11	52.4	10	47.6
Horticulture	7	43.8	9	56.2
Agricultural Education	1	9.1	10	90.1
Food Science	3	37.5	5	62.5
Dairy Science	1	14.3	6	85.7
Agronomy	5	71.4	2	28.6
Agricultural Communication	3	75.0	1	25.0
Agricultural Mechanics	1	50.0	1	50.0
Total	40	38.8	63	61.2

Of the 21 senior students majoring in Agricultural Economics, 52.4 percent leaned toward the field-dependent learning style and 47.6 percent leaned toward the field independent learning style. The raw GEFT scores ranged from 4 to 18 with a raw mean GEFT score of 11.1.

Table 4

Mean Preferred Learning Style Score by Major (n=103)

Major	n	Mean	SD	Range
Animal Science	27	13.1	3.99	2-18
Agricultural Economics	21	11.1	4.65	4-18
Horticulture	16	12.1	4.69	3-18
Agricultural Education	11	15.6	2.70	9-18
Food Science	8	11.3	5.23	1-17
Dairy Science	7	13.7	2.29	11-17
Agronomy	7	12.3	2.63	10-17
Agricultural Communication	4	8.8	5.38	2-15
Agricultural Mechanics	2	10.5	3.54	8-13

Note. Raw scores are based on a maximum possible score of 18
Group range = 8.8 - 15.6

Of the 16 senior students majoring in Horticulture, 43.8 percent leaned toward the field-dependent learning style and 56.2 percent leaned toward the field-independent learning style. The raw GEFT scores ranged from 3 to 18 with a raw mean GEFT score of 12.1.

Of the 11 senior students majoring in Agricultural Education, 9.1 percent leaned toward the field-dependent learning style and 90.1 percent leaned toward the field-independent learning style. the raw GEFT scores ranged from 9 to 18 with a raw mean GEFT score of 15.6.

Of the eight senior students majoring in Food Science, 37.5 percent leaned toward the field-dependent learning style and 62.5 percent leaned toward the field-independent learning style. The raw GEFT scores ranged from 1 to 17 with a raw mean GEFT score of 11.3.

Of the seven senior students majoring in Dairy Science, 14.3 percent leaned toward the field-dependent learning style and 85.7 percent leaned toward the field-independent learning style. The raw GEFT scores ranged from 11 to 17 with a raw mean GEFT score was 13.7.

Of the seven senior students majoring in Agronomy, 71.4 percent leaned toward the field-dependent learning style and 28.6 percent leaned toward the field-independent learning style. the raw GEFT scores ranged from 10 to 17 with a raw mean GEFT score of 12.3

Of the four senior students majoring in Agricultural Communication, 75.0 percent leaned toward the field-dependent learning style and 25.0 percent leaned toward the field-independent learning style. The raw GEFT scores ranged from 2 to 15 with a raw mean GEFT score was 8.8.

Of the two senior students majoring in Agricultural Mechanics, one leaned toward the field-dependent learning style and one leaned toward the field-independent learning style. The raw GEFT scores ranged from 8 to 13 with a raw mean GEFT score of 10.5.

Conclusions, Recommendations, and Practical Importance

Senior students in the study who were enrolled in the College of Agriculture of The Ohio State University tended to prefer a field-independent learning style. The raw mean GEFT score for senior students enrolled in the college was 12.4 of a maximum possible score of 18. Witkin et al. (1977) reported a mean GEFT score of 11.6 for college graduates.

Of the senior students in the study enrolled in the College of Agriculture, males preferred a field-independent learning style, whereas females preferred a more field-dependent learning style. Persistent gender differences have been found in the field dependence/independence dimension by several researchers (Garger & Guild, 1984; Witkin, 1976), a finding supported by the current study.

Senior students in the study majoring in Animal Science, Horticulture, Agricultural Education, Food Science, and Diary Science tended to prefer a field-independent learning style. Conversely, senior students in the study majoring in Agricultural Economics, Agronomy, and Agricultural Communication tended to prefer a field-dependent learning style.

Instructors should conceive learning style as referring to *actions* rather than ability of students. The key to utilizing information on students' learning style is to teach incorporating students' learning style, while also helping students "stretch" by teaching through other learning styles.

Because learning style affects the learning success of students in specific kinds of situations, instructors need to be sensitive to learning style differences - a charge leveled by Anderson and Adams (1992). Instructors should have insight of students' preferred learning style. Workshops on recognizing student learning styles should be offered to instructors. With leadership from the College of Agriculture teaching committee, learning style workshops should be designed and implemented by teacher educators in agricultural education with expertise in learning theories. At the styles workshops, faculty can gain knowledge about learning styles by having their own learning style assessed. Guild indicated that it is important for instructors, when working with students, to understand both their own and the students' learning perspectives (Brandt, 1990), because as Dunn and Dunn (1979) suggested, instructors tend to teach the way they learn.

Thus, knowledge of learning styles will allow instructors to be more insightful about how to adapt instruction and curriculum to learning differences that will building on students' greatest strengths and addressing their weaknesses. Additionally, the use of learning style information will alert administrative leaders that the college is seriously interested in student learning; a purpose that needs to be embraced by instructors and administrators.

Students' learning style should be used to direct instructors to incorporate various teaching methods (discussion, role play, supervised study, lecture, case study, demonstrations, field trips, resource people, experiments), curriculum materials (textbooks, handouts, worksheets), and evaluation techniques (multiple choice, case studies, essays) into classroom discourse to reach students of differing learning styles.

Diversity in student learning styles identified in this study anchors the argument of the need for instructors to have a repertoire of teaching methods. Teacher educators in agricultural education should command leadership with the support from the college academic dean in offering seminars or workshops to instructors not having coursework in pedagogy to augment instructors' repertoire of teaching methods.

Students should have knowledge of their preferred learning style. During freshmen orientation programs, students should be assessed for their preferred learning style and offered counseling on how to adapt their learning style to various teaching styles they are destined to encounter in college classrooms. As a result, students will gain confidence in their learning strengths and develop various learning strategies for handling challenging situations that are certain to arise. Students will also begin to see how they learn most effectively and efficiently, thus allowing them to be better able to take responsibility for their own learning.

Students and instructors need to accept and value the diversity of learning styles. Beginning as entering college freshmen, students should be counseled on learning and teaching style differences and begin work on coping with these differences. Understanding differences in learning and teaching styles should enable students to improve their learning.

Academic advisors and college counselor should become knowledgeable about learning styles. Workshops should be offered to academic advisors and college counselors on learning styles. Knowledge about learning styles will allow academic advisors to diagnose students' preference for utilizing media, teaching methods, and curriculum materials that will capitalize on students' strengths, strengthen their weaknesses, and ensure success in coursework. Additionally, knowledge of student learning styles has great potential as a tool for college counselors to aid students in career planning (Witkin et al., 1977).

Research on learning styles in higher education should continued. Further research should investigate the stability of the current research reported and be expanded to other colleges of agriculture. Furthermore, for each academic major in colleges of agriculture, a representative sample of students should be drawn to assess students' learning style by major. Research should also be conducted to investigate if college modes of teaching tend to systematically favor one style of learning over another and how these modes of teaching relate to the completion-rate of students as a result of their preferred learning style. Additionally, research should be conducted to determine if students taught in their preferred learning style score higher on tests, assignments, and attitude than those taught in a manner dissonant from their orientation.

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EXAMINING THE LEARNING STYLES OF STUDENTS IN A COLLEGE OF AGRICULTURE

A Critique

Douglas A. Pals, University of Idaho--Discussant

With the current focus on quality teaching by many Universities in recent years, the study examining the learning styles of undergraduates is timely. The authors cited a few researchers who have contributed to the research on student learning styles in colleges of agriculture and developed a sound rationale for expansion of this research area. There was an adequate review of the theoretical framework of the problem.

The research methods were clear and appropriate. I question the value of the analysis of preferred learning style by academic major when the number of respondents for more than half of the majors was less than 10. Is the data meaningful when 3 students are field-dependent and 1 student is field-independent?

The findings were interesting and the authors indicated that the results of previous studies were supported by this study. I find it challenging that we have all of the research supporting the importance of learning styles in affecting the learning success of students, however, we see little of this knowledge implemented in college teaching. Although I would not disagree with the recommendations presented by the authors, are they able to make those recommendations based solely on the findings of this study? The purpose of this study was to determine what was the preferred learning style of students in the College of Agriculture. The authors should be cautioned to make recommendations that are supported by the data presented in the study.

The question is now what? If we have the data to support the idea that indeed students do have different learning styles why are we not conducting the workshops to encourage administrators, instructors, and students to become aware of the importance of identifying learning styles and adapting teaching strategies to enhance learning? Do we need to address what are the barriers in utilizing learning styles in our college classrooms? Does the profession need to measure how much learning is improved when learning styles are used in the development of learning materials and evaluation techniques? I commend the authors on a well-written paper and adding to the knowledge base indicating that indeed students do have different learning styles. I would also encourage the profession to look at how we implement strategies to make use of this research.

DEVELOPING A SCALE TO RESEARCH AND EVALUATE YOUTH LEADERSHIP LIFE SKILLS DEVELOPMENT

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Introduction and Theoretical Base

As the world enters the 21st century, many youth development programs are focusing on the effectiveness of their leadership training. As resources become more limited, these organizations are also becoming more accountable for meeting their goals. Assuming responsibility and accountability for developing youth leadership life skills today, assures the promise for effective leadership tomorrow.

In agricultural education, both 4-H and FFA are working toward leadership development The Cooperative Extension Service (CES) and agricultural education have long been interested in whether or not 4-H and FFA programming are effective in developing youth leadership skills. Based on their experience, many CES and agricultural education personnel, as well as past 4-H and FFA members think youth leadership programming is effective. However, there is little research to support that viewpoint.

Miller (1976, p.2) defined leadership life skills development as self-assessed and organization-specific "development of life skills necessary to perform leadership functions in real life." The literature shows that different researchers have attempted to measure this construct for different target populations. Miller (1975) and Miller (1976) are two of the earliest sources of indicators on youth leadership life skills development. Others have adapted these early works to measure leadership life skills development (Blackwell, 1990; Mueller, 1989; Orr & Gobeli, 1986; Miller, 1981), among 4-H members. A sub-scale of the Leadership and Personal

Development Inventory (Carter, 1989) has also been developed to assess leadership development. This sub-scale has been used with high school students (Carter & Spotanski, 1989). Luft (1986) assessed leadership development with young rural adults (i.e., ages 18-40) using 70 different indicators. The review of the literature reveals that to date, researchers have not completed the task of conceptualizing; operationalizing; and assessing the validity, reliability, and dimensionality of a measure of leadership life skills development for research and evaluation with both 4-H and FFA members.

Purpose of the Study

The purpose of this study was to develop a valid and reliable scale to measure youth leadership life skills development. The following steps were followed to develop the scale:

1. conceptualize youth leadership life skills development
2. operationalize youth leadership life skills development
3. assess face and content validity
4. assess construct validity
5. assess reliability
6. assess dimensionality

Methods/Procedures

Population/Sample Design

The target population for the study was 6,388 1993 senior 4-H and FFA members from New Mexico. Membership rosters, provided by the State 4-H office and State Supervisor of Agricultural Education, were used to determine the population size. At a 95% confidence level, a sample size of 362 was needed to represent the population (Krejcie & Morgan, 1970). This number was rounded to 400 (the confidence level increased slightly to 95.2% with this oversampling). A random sample, stratified proportionally to ensure organizational representation (i.e. 46% or 183 senior 4-H members and 54% or 217 FFA members), was then generated with a random numbers table.

The study used descriptive-correlational methodology. Variables measured by mail questionnaire were youth leadership life skills development, self-esteem, years in 4-H or FFA, and size of home community. Self-esteem, years in 4-H or FFA, and size of home community were included for construct validity assessment purposes.

Data Collection

Data were collected during September and October 1992 following the Dillman procedure for mail questionnaire administration (1978). The first three mailings (i.e. questionnaire, two-week postcard reminder, and four-week replacement questionnaire) were sent to the youth's home. Incentives were sent with each of these mailings to increase response rate. Seven weeks after the first mailing, a fourth mailing was sent to 4-H agents and secondary agricultural education teachers. These professionals were given a list of their senior 4-H members or FFA members who had not responded, and a supply of questionnaires and return-postage envelopes, and professionals were asked to encourage listed youths to respond.

A return rate of n = 241 (60%) and a usable return rate of 236 (59%) were obtained from the four mailings. To check for non-response bias, 11 nonrespondents (i.e., six 4-H and five FFA members) were contacted by phone. Their responses were pooled with the responses of 15 subjects who responded after the final return deadline. These pooled responses were compared with those of early respondents on youth leadership life skills development, self-esteem, years in 4-H/FFA, and size of home community, using Mann-Whitney U and t-tests. No differences were found, therefore the data collected are considered to be representative of the target population. Nonrespondents were pooled with respondents, yielding a final usable return rate of 66% (n=262).

CONCEPTUALIZING AND OPERATIONALIZING YOUTH LEADERSHIP LIFE SKILLS DEVELOPMENT

The review of literature showed that a highly comprehensive conceptualization of youth leadership life skills development was developed by Miller (1976 & 1975). Miller (1975) used a modified Delphi technique to obtain consensus among 4-H members, volunteer adult 4-H leaders, and Cooperative Extension personnel in Oklahoma about youth leadership life skills developed in 4-H. They started with 68 leadership life skills in six "generic categories" (p.27): decision making, relationships, learning, management, understanding self, and group process. Only 17 of these 68 skills reached a consensual first-priority list (p.40). None of these skills were in the decision-making category.

Miller (1976) used opinion from a panel of Cooperative Extension Service experts to build upon the results of the Delphi study (Miller, 1975). The panel re-conceptualized leadership life skills developed in 4-H as having seven sub-domains including decision making and a new category, communication. The construct was re-operationalized with 60 indicators, with 12 that were on the first-priority list from the Delphi study.

Many other researchers measuring youth leadership life skills development have adapted the Miller (1976) re-conceptualization. Blackwell (1990) and Mueller (1989) purposively chose 25 indicators from the Miller (1976) list of 60. Orr & Gobeli also chose 14 indicators from the Miller (1976) list. The Carter (1989) Leadership & Personal Development Instrument contains 6 indicators specific to leadership. Five of these six match with indicators from the Miller (1976) list. Luft (1986) measured leadership development among young rural adults with 70 indicators organized into four conceptual sub-domains (i.e., general leadership, speaking skills, group leadership skills, and work-related leadership). Three of these sub-domains match well with Miller's (1976) conceptualization. The work-related leadership sub-domain contains indicators that deal with occupation and hence are not applicable to non-working youth. Additionally, Luft's (1986) indicators were not developed into a summated scale.

For the purposes of this study, youth leadership life skills development was conceptualized as having 68 indicators categorized into the seven sub-domains from Miller (1976) (Table 1). The 68 indicators of youth leadership life skills development came from the following sources:

1. the 60 indicators of leadership life skills developed in 4-H from Miller (1976)
2, three first-priority list indicators from Miller (1975) that were not among these 60
3. two indicators dealing with manners and personal appearance and one indicator dealing with decision making from FFA materials by Harp (1984)
4. two researcher-developed indicators, one related to problem solving and the other related to learning by doing based on the 4-H and FFA mottos.

Among the 68 indicators, were five that matched five of the six indicators from Carters' (1989) sub-scale of leadership development in the Leadership and Personal Development Instrument.

Double-barreled indicators, common among Miller's (1975 & 1976) leadership development indicators, were simplified to measure single concepts. When making decisions to simplify double-barrelled indicators, the researchers chose the word they felt youth would most likely understand.

Each youth leadership life skills development indicator used a four-point sub-scale ranging from "no gain" to a "lot of gain." An example of an indicator in the communication sub-domain was: "As a result of my 4-H (FFA) experience I can speak before a group (no gain, slight gain, moderate gain, a lot of gain)."

FACE AND CONTENT VALIDITY

Although 66 of the 68 indicators of youth leadership life skills development came from the literature and all 68 fell into one of the seven conceptual sub-domains (Table 1), the questionnaire was further assessed for face and content validity by a panel of seven experts. These included two state Cooperative Extension Service administrators, two faculty members in vocational education, a faculty member in educational administration, and two faculty members in research methods and statistics. The goal of subsequent mailings was to assess construct validity, reliability, and dimensionality leading to the development of a summated scale for measuring youth leadership life skills development.

Table 1
Conceptualization and Operationalization of Youth Leadership Life Skills Development

Conceptual Sub-domain	Number of Indicators
Communication Skills	11
Decision-making Skills	7
Skills in getting along with others	11
Learning Skills	10
Management Skills	11
Skills in understanding yourself	12
Skills in working with groups	6
TOTAL	68

CONSTRUCT VALIDITY

During construct validity assessment, indicators of youth leadership life skills development were eliminated in the following manner:

Item analysis

Item analysis was performed on the scale of 68 indicators following steps outlined by Ary, Jacobs, and Razavieh (1990). The first step of this procedure calls for dropping indicators that correlated below .25 with respondents' total score for the scale. No indicators were eliminated by this criterion. Next, the researchers looked for discriminating indicators. Indicators yielding data with low variance (i.e., sd $< .70$) or extreme skewness (i.e., $X > 2.5$) were eliminated. Based on these criteria, six indicators were eliminated, reducing the scale to 62 indicators.

Internal structure construct validity

Following item analysis, each indicator was evaluated in relationship to other indicators in the scale. An indicator was eliminated if it had a negligible or low association (measured by Spearman rho coefficients) with single indicators in the scale, i.e., its average inter-item correlation was below 0.40 (midpoint in the moderate association category of Davis, 1971) and it correlated below 0.40 with at least half of the other indicators in the scale. Based on these criteria 26 indicators were eliminated, reducing the scale to 36 indicators.

Cross structure construct validity

Next, remaining indicators were evaluated in relationship to indicators of other concepts known to have relationship with youth leadership life skills development. Indicators of youth leadership life skills development should have stronger relationships with other indicators of youth leadership life skills development than with indicators of other concepts. However, relationships between indicators of youth leadership life skills development and other concepts should be in the same direction as found in the literature.

For assessing cross-structure construct validity, three validators were included on the questionnaire based on presumed theoretical relationships with youth leadership life skills development: self-esteem (hypothesized positive correlation), (Blackwell, 1990; Mueller, 1989); years in 4-H or FFA (hypothesized positive correlation), (Miller, 1987; Orr & Gobeli, 1986; Waguespack, 1983); and size of home community, ranging from farm or ranch to suburb or city over 50,000 in population (hypothesized negative correlation), (Heinsohn & Cantrell, 1986). Criterion for assessing cross-structure validity were:

a. An indicator was eliminated if it had at least a low association (midpoint in the low association category of Davis, 1971) with one or more of the validators (i.e., self-esteem, years in 4-H or FFA, or size of home community). In other words, the absolute value of its correlation with one or more of the validators was greater than or equal to 0.20.

b. An indicator was eliminated if the direction of the relationships between the indicator and the three validators was opposite from the hypothesized direction (i.e., the indicator had negative correlations with RSE and years in 4-H or FFA, and a positive correlation with size of home community).

No indicators had at least a low association with RSE or size of home community. Six indicators had at least a low association with years in 4-H or FFA. Eliminating these reduced the scale to 30 indicators. No indicators were eliminated based on the criterion for direction of correlations with the validators. All seven of the original conceptual sub-domains (Miller, 1976) are represented in the final scale (Table 2).

RELIABILITY

Using Cronbach's coefficient alpha, reliability was assessed on the scale remaining after item analysis and construct validity assessment. The indicators most weakly related to the scale were to be eliminated in a stepwise fashion until the reliability coefficient peaked. However, the highest reliability had already been obtained without eliminating items. The final summated scale of 30 indicators had a Cronbach's alpha coefficient of .98. The scale is summarized by original conceptual sub-domains in Table 2.

Scale scores can range from 0 to 90. The frequency distribution of youth leadership life skills development scores from this study was slightly negatively skewed (i.e., 14% of allowable skewness as determined by the formula: percent possible skewness = [(mean = median)/standard deviation] x 100). The distribution also had a slight ceiling effect, with 15 of the 262 (6%) respondents receiving a perfect score. Further analysis could determine if the ceiling effect was caused by response set or an artificial limitation imposed by the scale. Using the scale with less homogenous groups may reduce the ceiling effect and skewness.

A secondary concern was the reliability of the Roseneberg Self-Esteem Scale (RSE) used as a validator for cross-structure construct validity assessment. The RSE is a 10-item, unidimensional Guttman scale (Wylie, 1974). Wylie (1974) reported a reproducibility coefficient of .92, a two-week test-retest reliability coefficient of.85, and convergent and discriminant validity for the RSE. A post hoc, split-half reliability assessment on the data from this study revealed a reliability coefficient of .68.

DIMENSIONALITY

Principle factor extraction (using SAS PROC FACTOR version 6.07) yielded evidence of a single factor. The largest eigenvalue of the correlation matrix was 15.11. accounting for 86% of the variability. The second eigenvalue was 0.964, accounting for 5.5% of the generalized variance. The third and fourth factors accounted for 3% and 2.4% of the generalized variance, respectively.

Table 2
Youth Leadership Life Skills Development

Conceptual Sub-domain	Number of Indicators
Communication Skills	2
Decision-making Skills	5
Skills in getting along with others	7
Learning Skills	4
Management Skills	3
Skills in understanding yourself	6
Skills in working with groups	3
TOTAL	30

A four-factor solution was used to check for factor interpretability, as the single dominant eigenvalue suggested any interpretable factors must be correlated. An orthogonal (varimax) prerotation was used with a promax (oblique) rotation (Harman, 1980) to produce the final factor solution. The factor loading produced was incoherent; no reasonable interpretations of the factor loadings were found. The researchers concluded a single factor exists in this population, contrasting with the seven sub-domains conceptualized by Miller (1975 & 1976).

Results and Conclusions

1. Care was taken to develop a valid and reliable 30-indicator summated scale for measuring youth leadership life skills development. Researchers were concerned that items in the scale would be more highly correlated with other internal measures than external measures.
2. An original conceptualization of youth leadership life skills development from Miller (1976) identified seven sub-domains for the construct. Although the scale derived in this study contains indicators from these seven original conceptual sub-domains, youth in the population appeared to perceive the construct as unidimensional.

Recommendations

1. In its entirety, the scale is a valid and reliable measure of youth leadership life skills development. The scale may be used a dependent variable in a wide variety of studies using a wide variety of research designs, including studies that attempt to predict youth leadership life skills development based on youth organization participation and causal-comparative studies.
2. The instrument should continue to be assessed for validity and reliability with youth leadership organizations other than 4-H or FFA and in settings other than New Mexico.
3. The scale can also be used an evaluation tool to assess youth leadership life skills development. Data can be obtained both formatively and summatively.
4. Due to the perceived unidimensionality of this scale, researchers and practitioners are cautioned against using the indicators grouped by original sub-domain (Table 2), or any other arrangement, as sub-scales of youth leadership life skills development.

   Further research will determine if the scale is unidimensional for other target populations.

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DEVELOPING A SCALE TO RESEARCH AND EVALUATE YOUTH LEADERSHIP LIFE SKILLS

A Critique

Douglas A. Pals, University of Idaho--Discussant

The researchers' introduction developed a sound argument that the profession needs to strengthen the data available to support the fact that 4-H and FFA youth programming is effective. The reader is convinced that more needs to be done to develop a valid and reliable scale to measure youth leadership life skills development. The purpose of the study was clearly stated.

The research procedures used in the study were clearly presented and appropriate. I was interested in more detail on how the questionnaire was constructed. The description of the four-point sub-scale left me confused how the authors utilized the data produced by the questionnaire in limiting the indicators from 68 to 30. The data collection procedures were appropriate and I commend the researchers for a well-documented follow-up of nonrespondents. The procedures used to determine the youth leadership life skills development was clearly outlined. Within my limitations, the procedures used to develop the 30-indicator summated scale were used appropriately.

The recommendations presented by the authors are well described and are founded in the study findings. I especially appreciated the warning that others should proceed with caution in using the indicators grouped by original sub-domain as sub-scales of youth leadership life skills development. It would be interesting to see if the instrument developed will enhance the evaluation of youth leadership life skills development, and provide more documentation on the value of the 4-H and FFA youth leadership programs.

The authors are to be commended for a well-written research paper. It is worth noting that the researchers were not satisfied with current instruments available and systematically took the time and effort to develop one that may help the profession to document the worth of the important leadership components of two agricultural education programs. The profession needs to continue to assess the validity and reliability of this instrument.

PREDICTING YOUTH LEADERSHIP LIFE SKILLS DEVELOPMENT AMONG FFA MEMBERS IN ARIZONA, COLORADO, AND NEW MEXICO

by

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Introduction and Theoretical Base

The Labor Secretary's Commission on Achieving Necessary Skills (SCANS) has identified many leadership skills and qualities among groupings of basic skills, thinking skills, personal qualities, resource allocation skills, interpersonal skills, and organizational skills that will be needed by workers for "productive and meaningful employment in today's workforce (Brock, 1992, p. 22)." By focusing on developing agricultural leadership, cooperation, and citizenship, the National FFA Organization also focuses on skills for today's workforce. It is almost taken for granted by agricultural and other educators that youth who participate in youth organization leadership activities such as public speaking, holding an office, or attending meetings are developing leadership skills. How true is this perception?

Brannon, Holley, and Key (1989) found Oklahoma community leaders who participated in vocational agriculture and FFA in high school were more likely to be involved in community affairs organizations, school organizations, church groups, agricultural groups, and educational groups. Townsend and Carter (1983) found a significant positive relationship between FFA participation scores and leadership scores for 12th-grade vocational agriculture students in Iowa. Participants in 18 different FFA activities had a higher perception of their leadership skills than nonparticipants. In Tennessee, vocational agriculture/FFA students from superior FFA chapters had higher leadership and personal development scores than students from nonsuperior chapters (Riketts & Newcomb, 1984). Vocational agriculture/FFA students from nonsuperior chapters still had higher scores than nonvocational agriculture students from schools with superior FFA chapters. Miller (1987) found 4-H alumni were more likely to be involved in community activities than nonalumni.

Mueller (1989) found a relationship between participation in 4-H leadership activities and youth leadership life skill development. In Iowa, high school students who were officers or committee chairpeople in school or community organizations had higher leadership attainment scores than nonofficers or nonchairpeople (Carter & Spotanski, 1989). Students who had received leadership training also had higher leadership attainment scores on a six- indicator scale developed by Carter (1989).

Other studies have yielded conflicting results. Vail (1988) found more similarities than differences between national leaders with and without vocational student organization backgrounds. Cubilla (1989) also found more similarities than differences between national leaders with or without 4-H backgrounds. Still, the literature generally supports a relationship between participation in youth leadership activities and the development of leadership skills.

Miller (1976, p.2) defined youth leadership life skills development as self-assessed and organization-specific "development of life skills necessary to perform leadership functions in real life." Boyd, Herring, and Briers (1992) found level of 4-H participation was a significant predictor of leadership life skills development scores among 4-H youth in Texas. They also observed higher leadership life skills development for 4-H members than non-members. Dormody and Seevers (1993) found participation in leadership activities to be a significant predictor of youth leadership life skills development among senior 4-H members in Arizona, Colorado, and New Mexico.

Along with participation in youth leadership activities, other variables that have also been shown to have a relationship with youth leadership life skills development in agricultural education are achievement expectancy (Seevers & Dormody, 1993) self esteem (Blackwell, 1990; Mueller, 1989), years in the youth organization (Miller, 1987; Orr & Gobeli, 1986; Waguesback, 1983), age (Boyd et al., 1992), ethnicity (Blackwell, 1990; Seevers & Dormody, 1993), gender (Luft, 1986; Orr &

Gobeli, 1986; Seevers & Dormody, 1993; Waguesback, 1983), and place of residence (Heinsohn & Cantrell, 1986).

Previous research in agricultural education on youth leadership life skills development has concentrated on 4-H members. Many past studies have not completed the task of conceptualizing, operationalizing, validating, and assessing the reliability and dimensionality of measures of youth leadership life skills development, particularly for use with FFA members. Seevers and Dormody (1992) completed these steps, begining with integrating and cross-validating conceptualizations proposed by Harp (1984), Miller (1975), Miller (1976), and Waguesback (1983). Validation procedures and assessment for reliability and dimensionality resulted in a summated scale for measuring the leadership life skills development of both 4-H and FFA members (Dormody, Seevers, & Clason, 1993). The scale, used in a previously unresearched and ethnically diverse geographical setting with FFA members, would provide a needed source of data to further strengthen the theoretical base for a relationship between participation in FFA leadership activities and leadership life skills development. Such knowledge could also assist practitioners in developing more effective FFA leadership development programs.

Purpose and Objectives

The purpose of this study was to determine predictors of youth leadership life skills development among 1992-93 FFA members in Arizona, Colorado, and New Mexico. Specific objectives of the study were:

1. To describe FFA members by their youth leadership life skills development, participation in FFA leadership activities, achievement expectancy, self esteem, years in FFA, age, ethnicity, gender, and place of residence.
2. To determine the predictors of leadership life skills development from among participation in FFA leadership activities, achievement expectancy, self esteem, years in FFA, age, ethnicity, gender, and place of residence.

Procedures

1992-1993 FFA membership rosters were obtained from State Departments of Education in Arizona, Colorado, and New Mexico. From the rosters, the population of FFA members in the three states was calculated to be 9,549. At a 95% confidence level a sample size of 370 was needed to represent the population (Krejcie & Morgan, 1970). This number was rounded to 400 (the confidence level increases slightly to 95.2% with this oversampling). A random sample of FFA members, stratified proportionally by state to ensure representation, was generated.

The study used descriptive survey methodology. The dependent variable was youth leadership life skills development; the main independent variable was participation in FFA leadership activities. Other independent variables included as control variables were: (a) achievement expectancy, (b) self esteem, (c) years in FFA, (d) age, (e) ethnicity, (f) gender, and (g) place of residence.

All parts of the instrument and a parallel instrument for 4-H were assessed for content and face validity by a panel of experts consisting of two faculty members in vocational education, two state Cooperative Extension Service administrators, a faculty member in educational administration, and two faculty members in research methods and statistics. The 30-indicator, unidimensional Youth Leadership Life Skills Development Scale (YLLSDS) was used to measure the dependent variable (Dormody, Seevers, & Clason, 1993). During its development, the YLLSDS had been assessed for reliability following a pilot test with 262 FFA and senior 4-H members in New Mexico (Seevers & Dormody, 1992). Cronbach's coefficient alpha for the scale was .98. Scores on the YLLSDS can range from 0 to 90.

Participation in FFA leadership activities was measured by a 25-indicator index adapted from Mueller (1989), which listed FFA leadership activities by various levels of participation ranging from no participation through local, district, state, regional and national participation, depending on the activity. Scores on the participation index can range from 0 to 62. A two-week test-retest procedure with 19 youth who were not part of the sample yielded a reliability coefficient of .97 for the index.

Achievement expectancy was assessed with a two-indicator summated scale adapted from Canfield (1976). One indicator asked members to indicate the level of evaluation they expect to get on their FFA activities and projects ranging from outstanding to poor. The other indicator asked them to indicate the level of performance they expected from themselves during FFA activities and projects, also ranging from outstanding to poor. Scores on the scale can range from zero to eight. The two-week test-retest reliability coefficient for the scale was .67.

Self esteem was measured by the Rosenberg Self-Esteem Scale (RSE), a 10-item, unidimensional Guttman scale (Wylie, 1974). Split-half reliability assessment of the RSE during the pilot testing of the YLLSDS yielded a coefficient of .68 (Seevers & Dormody, 1992).

Data were collected from March through June 1993 following the Dillman (1978) procedure for mail questionnaire administration. Incentives were sent with the three mailings to increase response rate. A response rate of 67% (n=266) was obtained. Complete data for the regression analysis was submitted by 256 (64%) of the respondents. To check for nonresponse bias, 10 nonrespondents were contacted by telephone. Nonrespondents were compared statistically to respondents by youth leadership life skills development, years in FFA, age, gender, ethnicity, place of residence and state. The two groups differed significantly only by ethnicity, with respondents having a higher percentage of minority members than nonrespondents. Therefore, findings related to ethnicity will not be generalized to the target population.

Objective 1 was analyzed using descriptive statistics (i.e., means, medians, modes, standard deviations, ranges, frequencies, and percentages). Objective 2 was analyzed using stepwise, multiple regression. Due to the exploratory nature of the study, a Type II error was judged potentially as serious as a Type I error. Therefore, a significance level of 0.15 was set a priori for the regression analysis. Because a large number of independent variables was used in the regression analysis, multicollinearity indices were also analyzed. No serious collinearity problems between the independent variables were observed.

Results

Objective 1

FFA members' Youth Leadership Lifes Skills Development Scale (YLLSDS) scores ranged from zero to 89 with a mode of 66 (n=15) and a median of 67.5. The youth had a mean of 64.2 (sd=17.7) on the YLLSDS. Given this mean, standard deviation, and median, and using the formula: percent possible skewness = mean - median / standard deviation x 100, the distribution of YLLSDS scores was determined to be skewed slightly negatively, containing 19% of possible skewness (Table 1).

Table 1
Descriptive Statistics for Interval and Ratio Data Variables (n=256)

Variable	X	Median	Mode	sd	Range
Youth ldr. life skills devel. (YLLSDS)	64.2	67.5	66	17.7	0-89
Participation in FFA leadership act.	12.6	12	12	7.5	0-44
Achievement expectancy	6.1	6	6	1.3	0 - 8
Self esteem (RSE)	5.3	6	6	0.9	2 - 6
Years in FFA	2.3	2	1	1.3	1 - 8
Age	16.3	16	17	1.5	13-22

Scores on the participation in FFA leadership activities index essentially ranged from zero to 32 (one respondent scored a 44) with a mode of 12 (n=37) and a median of 12. FFA members had a mean of 12.6 (sd=7.5) on the index. The distribution of index scores was nearly normal, containing only 8% of possible skewness (Table 1).

Scores on the achievement expectancy scale essentially ranged from four to eight (one respondent scored a zero) with a mode of six (n=76), median of six, and a mean of 6.1 (sd=1.3). The distribution of scale scores was nearly normal, containing only 8% of possible skewness (Table 1).

Scores on the RSE scale ranged from two to six with a mode of six (n=134) and a median of six. FFA members had a mean of 5.3 (sd=0.9) on the RSE scale. The distribution of RSE scores was skewed strongly negatively, containing 78% of possible skewness (Table 1).

FFA members' years in FFA ranged from one to eight with a mode of one year (n=86) and a median of two years. Members averaged 2.3 years (sd=1.3) in the organization. The distribution of years in FFA was skewed slightly positively, containing 23% of possible skewness (Table 1).

FFA members' ages ranged from 13 to 22 with a mode of 17 (n=69). The members averaged 16.3 (sd=1.5) years of age. The age distribution was skewed slightly positively, containing 20% of possible skewness (Table 1).

Because of the low percentage of minority FFA members in the sample (19.1% or n=49), minority categories were combined for analysis. Half the FFA members (n=128) were from a farm or ranch. Another 30% (n=76) were either rural non-farm/ranch residents or from a town of under 10,000 in population. FFA members were 41% (n=105) female (Table 2).

Table 2
Descriptive Statistics for Nominal and Ordinal Data Variables (n=256)

Variable	Category	f	%
Ethnicity	White	207	80.9
	Minority	49	19.1
Gender	Female	105	41.0
	Male	151	59.0
Place of residence	Farm or ranch	128	50.0
	Rural non-farm or town < 10,000	76	29.7
	Town or city 10,000 - 50,000	36	14.1
	Suburb or city > 50,000	16	6.3

Objective 2

Three variables - achievement expectancy, participation in FFA leadership activities, and gender - explained significant amounts of the variance in YLLSDS scores after controlling for self esteem, years in FFA, age, ethnicity, and place of residence (Table 3). Achievement expectancy explained approximately 13.6%, participation in FFA leadership activities 2.3%, and gender 0.9%. The three-variable solution explained 16.7% of the variance in YLLSDS scores. The insignificant variables explained only another 0.9% of variance in YLLSDS scores. The regression model for predicting youth leadership life skills development from achievement expectancy and participation in FFA leadership activities is:

> YLLSDS score = 33.5 + (4.1)(achievement expectancy score) +
> (0.4)(participation in FFA leadership activities index score) +
> (3.3)[gender (where females are coded 1 and males coded 0)]

Table 3
Stepwise Multiple Regression Analysis of Youth Leadership Life Skills Development (n=255)

Source of variation	SS	df	MS	F	Prob.>F
Regression	13,295.0	3	4,431.7	16.9	0.0001
Error	66,146.5	252	262.5		
Total	79,441.5	255			

Variables in the equation

Variable	Parameter Estimate	Standard Error	T	Prob.>|T|	Partial R square
Intercept	33.5	4.7	7.3	0.0001	
Ach. expectancy	4.1	0.8	5.1	0.0001	0.136
Participation in FFA leadership act.	0.4	0.1	2.5	0.0110	0.023
Gender	3.3	2.1	1.6	0.1101	0.009

Conclusions

1. Achievement expectancy, or a combination of the level of evaluation FFA members expect from others and the level of performance they expect from themselves in FFA activities and projects, had a positive relationship with

youth leadership life skills development. It explained close to 14% of the variance in YLLSDS scores. In a similar study of senior 4-H members, Seevers and Dormody (1993) found achievement expectancy explained about 2% of the variance in YLLSDS scores.

2. Participation in FFA leadership activities had a weak positive relationship with youth leadership life skills development and explained 2.3% of the variance in YLLSDS scores. This result is similar to Boyd, Herring, and Briers (1992) who found 4-H participation explained 3.3% of the variance in leadership life skills development scores. However, Seevers and Dormody (1993) found participation in 4-H leadership activities explained 12.6% of the variance in YLLSDS scores among senior 4-H members.
3. Female FFA members had higher youth leadership life skills development than male members and gender explained 0.9% of the variance in YLLSDS scores. Seevers and Dormody (1993) found gender predicted 1.7% of YLLSDS scores among senior 4-H members.
4. Leadership life skills development was not related to self esteem, years in FFA, age, ethnicity, or place of residence.

Recommendations

1. Agricultural educators in the three states should focus on satisfying FFA members' achievement motives when developing FFA leadership activities. Challenging activities that balance cooperative, competitive, and personal development goals, should be developed.
2. Youth should be encouraged to join FFA and participate in leadership activities regardless of self esteem, years in FFA, age, ethnicity, or place of residence. Further research should look at which FFA activities are most effective in developing leadership life skills development and how these activities can be improved.

3. Further research should be conducted to determine why achievement expectancy scores appear to be a stronger predictor of youth leadership life skills development among FFA members than among senior 4-H members (Seevers & Dormody, 1993), while participation in leadership activities appears to be a stronger predictor of youth leadership life skills development among senior 4-H members (Seevers & Dormody, 1993) than among FFA members. Are these differences real? Is FFA more achievement oriented in its activities than 4-H? Is 4-H more leadership oriented in its activities than FFA? If so, what can these organizations learn from each other?
4. Leadership life skills development should be enhanced by the participation of FFA members in planning, implementing, and evaluating leadership activities. Further research should be conducted to determine the perceptions of FFA advisors and members regarding member participation in these stages of leadership activities.
5. One of the national goals for agricultural education is "to serve all people and groups equally and without discrimination" (National Council for Agricultural Education, 1990, p.4). Further research should focus on participation in FFA leadership activities by gender and ethnicity.
6. The prediction model determined by this study explains only 17% of the variance in youth leadership life skills development. Further research should search for other predictors.
7. Measures of youth leadership life skills development, participation in FFA activities, and achievement expectancy used in this study yielded distributions that approached normality for this population. They are recommended for further research with other youth and in other geographical settings.

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PREDICTING YOUTH LEADERSHIP LIFE SKILLS DEVELOPMENT AMONG FFA MEMBERS IN ARIZONA, COLORADO, AND NEW MEXICO

PREDICTING YOUTH LEADERSHIP LIFE SKILLS DEVELOPMENT AMONG SENIOR 4-H MEMBERS IN ARIZONA, COLORADO, AND NEW MEXICO

A Critique

Douglas A. Pals, University of Idaho--Discussant

Since the two research studies identified above were very similar and conducted using nearly the same theoretical framework, instruments, and research procedures I have elected to critique these two research papers together.

The introductions in both papers identified the previous research findings relating to these studies. It was clear that the rationale behind conducting the studies was to strengthen the theoretical base for a relationship between participation in 4-H and FFA activities and leadership life skills development. The purposes and objectives were clearly stated in both studies. A more detailed description of what the participants responded to on the instrument would have made it easier to conceptualize how the scores were obtained. If a reader was not familiar with the scales used it is difficult to attach meaning to the findings.

The procedures used to analyze the data were appropriate and clearly described. I found it interesting that participation in leadership activities appears to be a stronger predictor of youth leadership life skills development among senior 4-H members than among FFA members. I commend the authors in attempting to compare their research findings with the findings of previous studies.

The recommendations identified by the researchers could be stated confidently based on the findings of the two studies. I question whether the recommendation made that youth should be encouraged to join 4-H or FFA and participate in leadership activities regardless of self-esteem, years in the organization, age, or place of residence can be made so boldly when the prediction model explains 20% of the 4-H youth leadership life skills development and 17% of the FFA youth leadership life skills development. The recommendations for further research should be noted by the profession in order to search for additional predictors in order to better measure the impact of the 4-H and FFA youth leadership programs.

I would like to commend the researchers for a well-executed, comprehensive research effort to add to the research base in the area of predicting youth leadership life skill development. In the time of educational reform and governmental organizational realignment, the value of youth leadership programs can be severely questioned. The profession must be ready with quantitative and qualitative data to support the value of 4-H and FFA youth leadership programs.

PREDICTING YOUTH LEADERSHIP LIFE SKILLS DEVELOPMENT AMONG SENIOR 4-H MEMBERS: A TRI-STATE STUDY

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Introduction and Theoretical Base

It is commonly said that today's youth are tomorrow leaders. Leadership development has been and continues to be a major goal of most youth programs. The 4-H youth development program of the Cooperative Extension Service is no exception. The 4-H program states its' mission as, "To help youth and volunteers in their development through educational programs using the knowledge base of the land grant universities of the United States (USDA, 1986, p.4)." Commitment to the mission involves support of specific program objectives including helping youth develop leadership capabilities, personal standards and values, positive self concepts and effective communication skills. (USDA, 1986, p.5). As the world enters the 21st century, many youth programs, including 4-H, are focusing on the effectiveness of their leadership training. A general perception prevails that participation in a variety of activities or programs such as public speaking or holding office develops leadership life skills and self-understanding. The question remains - How accurate is this perception?

Miller (1976, p.2) defined youth leadership life skills development as self-assessed and organization-specific "development of life skills necessary to perform leadership functions in real life." Boyd, Herring, and Briers (1992) found level of 4-H participation was a significant predictor of leadership life skills development scores among 4-H youth in Texas. They also observed higher leadership life skills development for 4-H members and non members. According to Miller (1987) 4-H alumni were more likely to become involved in community activities than non alumni. Mueller (1989) also found a positive relationship between participation in 4-H leadership activities and youth leadership life skill development. A Michigan study (CES, 1976) found that leadership skills are learned through participation in 4-H activities and projects that provide youth the opportunity to participate in trial leadership roles.

Level and degree of participation is a factor to consider in the development of leadership life skills. Heinsohn and Cantrell (1986) found in a study involving 761 Pennsylvania 4-H youth that only 41% indicated involvement in leadership roles at the county level, 17% at the state level, while 92% of the leadership roles took place with the club program. They concluded that the greatest impact on leadership life skill development would be made by increasing youth involvement in leadership experiences beyond the community club level.

Other variables have also been shown to have a relationship with youth leadership life skills development. Included are achievement expectancy (Dormody & Seevers, 1993) self esteem (Blackwell, 1990; Mueller, 1989), years in the youth program (Miller, 1987; Orr & Gobeli, 1986; Waguesback, 1983), age (Boyd, et. al., 1993), ethnicity (Blackwell, 1990; Dormody & Seevers, 1993), gender (Luft, 1986; Orr & Gobeli, 1986; Dormody & Seevers, 1993; Waguesback, 1983), and place of residence (Heinsohn & Cantrell, 1986).

Existing research in agricultural and extension education on youth leadership life skills has concentrated on 4-H members. However, many of these studies did not completed the task of conceptualizing, operationalizing, validating and assessing the reliability and dimensionality of measures of life skills development as it relates to youth leadership. These steps were completed by Seevers and Dormody (1992), beginning with integrating and cross-validating conceptualizations proposed by Harp (1984), Miller (1975), Miller (1976), and Waguesback (1986). Validation procedures and assessment for reliability and dimensionality resulted in a summated scale for measuring the leadership life skills development of both 4-H and FFA members (Dormody, Seevers, & Clason, 1993). Use of the scale with 4-H members in an ethically diverse geographical setting would provide a needed source of data to further strengthen the theoretical base for a relationship between participation in 4-H leadership activities and leadership life skills development. Generation of such knowledge could also assist youth professionals and leaders in developing more effective 4-H leadership development programs.

Purpose and Objectives

The purpose of this study was to determine predictors of youth leadership life skill development among 1992-93 senior 4-H members in Arizona, Colorado, and New Mexico. Specific objectives of the study were:

1. To describe 4-H members by their youth leadership life skill development, participation in 4-H leadership activities, achievement expectancy, self-esteem, years in 4-H, age, ethnicity, gender, and place of residence.
2. To determine the predictors of leadership life skills development from among participation in 4-H leadership activities, achievement expectancy, self-esteem, years in 4-H, age, ethnicity, gender, and place of residence.

Procedures

1992-93 senior 4-H membership rosters were obtained from the State 4-H Offices in Arizona, Colorado, and New Mexico. From the rosters, the population of 4-H members in the three states was calculated to be 8,257. At a 95% confidence level a sample size of 367 was needed to represent the population (Krejcie & Morgan, 1970). This number was rounded to 400 (the confidence level increases slightly to 95.2% with this oversampling). A random sample of senior 4-H members, stratified proportionally by state to ensure representation was generated.

The study used descriptive survey methodology. The dependent variable was youth leadership life skills development, the main independent variable was participation in 4-H leadership activities. Other independent variables included as control variables were: (a) achievement expectancy, (b) self-esteem, (c) years n 4-H, (d) age, (e) ethnicity, (f) gender, and (g) place of residence.

All parts of the instrument and a parallel instrument for FFA were assessed for content and face validity by a panel of experts consisting of two faculty members in vocational education, two state Cooperative Extension Service administrators, a faculty member in educational administration, and two faculty members in research and statistics. The 30-indicator, unidimensional Youth Leadership Life Skills Development Scale (YLLSDS) was used to measure the dependent variable (Dormody, Seevers, & Clason, 1993). During its development, the YLLSDS had been assessed for reliability following a pilot test with 262 senior 4-H and FFA members in New Mexico (Seevers & Dormody, 1992). Cronbach's coefficient alpha for the scale was .98. Scores on the YLLSDS can range from 0 to 90.

Participation in 4-H leadership activities was measured by a 21-indicator index adapted from Mueller (1989), which listed 4-H leadership activities by various levels of participation ranging from no participation through local, district, state, regional and national participation, depending on the activity. Scores on the participation index can range from 0 to 62. A two-week test-retest procedure with 19 youth who were not a part of the sample yielded a reliability coefficient of .97 for the index.

Achievement expectancy was assessed with a two-indicator summated scale adapted from Canfield (1976). One indicator asked members to indicate the level of evaluation they expect to get on their 4-H activities and projects ranging from outstanding to poor. The other indicator asked them to indicate the level of performance they expected from themselves during 4-H activities and projects, also ranging from outstanding to poor. Scores on the scale can range from zero to eight. The two-week test-retest reliability coefficient for the scale was .67.

Self-esteem, was measured by the Rosenberg Self-Esteem Scale (RSE), a 10 item unidimensional Guttman scale (Wylie, 1974). Split-half reliability assessment of the RSE during pilot testing of the YLLSDS yielded a coefficient of .68 (Seevers & Dormody, 1992).

Data were collected from March through June 1993 following the Dillman (1978) procedure for mail questionnaire administration. Incentives were sent with the three mailings to increase response rate. A response rate of 59% (n=228) was obtained. Complete data for the regression analysis was submitted by 228 (57%) of the respondents. To check for nonresponse bias, 10 nonrespondents were contacted by telephone. Nonrespondents were compared statistically to respondents by youth leadership life skills development, years in 4-H, age, gender, ethnicity, place of residence and state. No significant differences were found in any of the categories between groups. Miller and Smith (1983) suggest that because the data were similar, respondents can be generalized to the population.

Objective one was analyzed using descriptive statistics (i.e. means, medians, modes, standard deviations, ranges, frequencies, and percentages). Objective 2 was analyzed using stepwise, multiple regression. Due to the exploratory nature of the study, a Type II error was judged potentially as serious as a Type I error. Therefore, a significance level of 0.15 was set a priori for the regression analysis. Because a large number of independent variables was used in the regression analysis, multicollinearily indices were also analyzed. No serious collinearlity problems between independent variables were observed.

Results

Objective 1

4-H members' Youth Leadership Life Skills Development Scale (YLLSDS) scores ranged from zero to 90 with a mode of 72 and a median of 69. The youth averaged 65.7 (sd=17.5) on the YLLSDS. Given this mean, standard deviation, and using the formula: percent possible skewness = mean - median / standard deviation x 100, the distribution of YLLSDS scores was determined to be skewed slightly negatively, containing 19% of possible skewness (Table 1).

Scores on the participation in 4-H leadership activities index ranged from zero to 51 with a mode of 16, and a median of 18.5. 4-H members averaged 20.5 (sd=11.2) on the index. The distribution of index scores was skewed slightly positively, containing 18% of the possible skewness (Table 1).

Scores on the achievement expectancy scale ranged from four to eight with a mode of six (N = 60), median of six, and a mean of 6.3 (sd=1.3). The distribution of scale scores was determined to be skewed slightly positively, containing 23% of possible skewness (Table 1).

Scores on the RSE scale ranged from zero to six with a mode of six (n=132) and a median of six. 4-H members averaged 5.3 (sd=.09) on the RSE scale. The distribution of RSE scores was skewed strongly negatively, containing 78% of possible skeweness (Table 1).

4-H members year in 4-H ranged from one to eleven with a mode of eight years (n=30) and a median of six years. Members averaged 5.9 years (sd=2.8) in the organization. The distribution of years in 4-H was considered to be nearly normal, containing only 4% of possible skewness (Table 1).

4-H members' ages ranged from 12 to 20 with a mode of 16 (n=72). The members averaged 16.3 (sd=1.4) years of age. The age distribution was skewed slightly positively, containing 21% of possible skewness (Table 1).

Because of the low percentage of minority 4-H members in the sample (10.5% or n=24), minority categories were combined for analysis. 4-H members that live on a farm or ranch comprised 44.3% of the sample. Another 33.3% were either rural non-farm/ranch residents or from a town under 10,000 in population. 4-H members were 59.2% (n=135) female (Table 2).

Table 1
Descriptive Statistics for Interval and Ratio Data Variables (n=228)

Variable	X	Median	Mode	sd	Range
Youth ldr. life skill dev. (YLLSDS)	65.7	69	72	17.5	0-90
Participation in 4-H ldr. activities	20.5	18.5	16	11.2	0-51
Achievement expectancy	6.3	6	6	1.3	4- 8
Self esteem (RSE)	5.3	6	6	0.9	0- 6
Years in 4-H	5.9	6	8	2.8	1-11
Age	16.3	16	17	1.4	12-20

Table 2
Descriptive Statistics for Nominal and Ordinal Data Variables (n=228)

Variable	Category	f	%
Ethnicity	White	204	89.5
	Minority	24	10.5
Gender	Female	135	59.2
	Male	93	40.8
Place of Residence	Farm or Ranch	101	44.3
	Rural non-farm or town < 10,000	76	33.3
	Town or city 10,000 - 50,000	22	9.6
	Suburb or city > 50,000	29	12.7

Objective 2

Four variables -- participation in 4-H leadership activities, achievement, ethnicity, and gender -- explained significant amounts of the variance in YLLSDS scores after controlling for self-esteem, years in 4-H, age, ethnicity and place of residence (Table 3). Participation in leadership activities explained approximately 12.6%, achievement expectancy 2.0%, ethnicity 3.3% and gender 1.8%. The four-variable solution explained 19.6% of the variance in YLLSDS scores. The regression model for predicting youth leadership life skills development from participation in 4-H activities, achievement expectancy, ethnicity, and gender is:

> **YLLSDS score = 39.9 + (9.5) (ethnicity) + (4.9) [gender (where females are coded 1 and males coded 0)] + (2.0) achievement expectancy + (.05) (participation in 4-H leadership activities index score)**

Table 3
Stepwise Multiple Regression Analysis of Youth Leadership Life Skills Development (n=228)

Source of variation	SS	df	MS	F	Prob.>F
Regression	698.6	4	3424.7	13.62	0.0001
Error	56080.9	223	251.5		
Total	69779.6	227			

Variables in the equation

	Parameter	Standard			Partial
Variable	Estimate	Error	T	Prob.>[T]	R square
Intercept	39.9	5.3	7.6	0.0001	0.019
Participation in 4-H leadership activities	0.5	0.9	2.4	0.0190	0.126
Ethnicity	9.5	3.5	2.7	0.0066	0.033
Ach. expectancy	2.0	0.9	4.3	0.0001	0.019
Gender	4.9	2.2	2.2	0.0294	0.017

Conclusions

1. Participation in 4-H leadership activities had a positive relationship with youth leadership life skills development, explaining 12.6 % of the variance in YLLSDS scores. This is an increase in predicted variance over other studies reporting participation in leadership activities as a predictor of YLLSDS. Boyd, Herring and Briers (1992) found 4-H participation explained 3.3% of the variance in leadership life skills development scores among Texas 4-H youth. Dormody and Seevers (1993) found that participation in FFA leadership activities explained 2.3% of the variance in Youth Leadership Life Skills Development (YLLSD) scores.
2. Minority 4-H members were found to have higher youth leadership life skills development scores than non-minority members, explaining 3.3% of the variance in

YLLSDS scores. These results are different than those found by Blackwell (1990) who found no differences in life skills gain between Anglo and Hispanic 4-H members and found the Native American group had significantly lower life skills gain scores than either Anglo or Hispanic members.

3. Achievement expectancy, or a combination of the level of evaluation 4-H members expect from others and the level of performance they expect from themselves in 4-H activities and projects, had a positive relationship with youth leadership life skill development, explaining 1.9% of the variance in YLLSDS scores. However, in a similar study, Dormody and Seevers (1993) found achievement expectancy of FFA members explained close to 14% of the variance in YLLSDS scores.
4. Gender was found to predict 1.7% of the variance in YLLSDS scores among senior 4-H members. Female members had higher youth leadership life skills development scores than males.
5. Leadership life skills development was not related to self-esteem, years in 4-H, age, or place of residence.

Recommendations

1. Youth should be encouraged to join 4-H and participate in leadership activities regardless of self-esteem, years in 4-H, age, or place of residence.
2. 4-H professionals and volunteer leaders should not only continue to involve and encourage participation in leadership activities at the club/county levels but provide opportunities and support for involvement at higher levels.
3. Further research should be conducted to determine why participation in leadership

activities appears to be a stronger predictor of youth leadership life skills development among senior 4-H members than among FFA members, (Dormody & Seevers, 1993), while achievement expectancy appears to be a stronger predictor of youth leadership life skills development among FFA members (Dormody & Seevers, 1993), than among senior 4-H members. Are these differences real? Is 4-H more leadership oriented in its activities than FFA? Is FFA more achievement oriented in its activities than 4-H? If so, what can these organizations learn from one another?

4. Leadership life skills development should be enhanced by greater participation of 4-H members in planning, implementing, and evaluating of 4-H leadership activities. Further research should be conducted to determine the perceptions of 4-H members, volunteer leaders, and professional staff regarding member participation in these phases of leadership activities.
5. Further research should be conducted to determine why specific 4-H activities were determined as the most effective in developing leadership life skills development.
6. The Extension Service - USDA and the 4-H Youth Development program are Equal Opportunity/Affirmative Action Institutions. Minority 4-H members were found to have higher youth leadership life skills development scores than non-minority members. However, minority membership represents a small percentage of the total enrollment. Minority youth should greatly benefit from participation in the 4-H program and 4-H leadership activities. Further research is recommended related to membership and participation in leadership activities by ethnicity and gender.

7. The prediction model determined by this study explains only 20% of the variance in youth leadership life skills development. Further research should search for other predictors.

8. Further research on leadership life skills development is recommended with other youth serving programs and in other geographical areas.

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PREDICTING YOUTH LEADERSHIP LIFE SKILLS DEVELOPMENT AMONG FFA MEMBERS IN ARIZONA, COLORADO, AND NEW MEXICO

PREDICTING YOUTH LEADERSHIP LIFE SKILLS DEVELOPMENT AMONG SENIOR 4-H MEMBERS IN ARIZONA, COLORADO, AND NEW MEXICO

A Critique

Douglas A. Pals, University of Idaho--Discussant

Since the two research studies identified above were very similar and conducted using nearly the same theoretical framework, instruments, and research procedures I have elected to critique these two research papers together.

The introductions in both papers identified the previous research findings relating to these studies. It was clear that the rationale behind conducting the studies was to strengthen the theoretical base for a relationship between participation in 4-H and FFA activities and leadership life skills development. The purposes and objectives were clearly stated in both studies. A more detailed description of what the participants responded to on the instrument would have made it easier to conceptualize how the scores were obtained. If a reader was not familiar with the scales used it is difficult to attach meaning to the findings.

The procedures used to analyze the data were appropriate and clearly described. I found it interesting that participation in leadership activities appears to be a stronger predictor of youth leadership life skills development among senior 4-H members than among FFA members. I commend the authors in attempting to compare their research findings with the findings of previous studies.

The recommendations identified by the researchers could be stated confidently based on the findings of the two studies. I question whether the recommendation made that youth should be encouraged to join 4-H or FFA and participate in leadership activities regardless of self-esteem, years in the organization, age, or place of residence can be made so boldly when the prediction model explains 20% of the 4-H youth leadership life skills development and 17% of the FFA youth leadership life skills development. The recommendations for further research should be noted by the profession in order to search for additional predictors in order to better measure the impact of the 4-H and FFA youth leadership programs.

I would like to commend the researchers for a well-executed, comprehensive research effort to add to the research base in the area of predicting youth leadership life skill development. In the time of educational reform and governmental organizational realignment, the value of youth leadership programs can be severely questioned. The profession must be ready with quantitative and qualitative data to support the value of 4-H and FFA youth leadership programs.

UNDERSTANDING AND PERCEPTIONS ABOUT AGRICULTURE OF TELEVISION NEWS REPORTERS

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INTRODUCTION AND THEORETICAL FRAMEWORK

The W. K. Kellogg Foundation (1984) reported knowledge of the agricultural industry and its influences are issues of great importance. Unfortunately, adult Americans do not seem to have an adequate understanding of agriculture and how it impacts their lives. A study conducted in Arizona (Behavior Research Center of Phoenix, 1989) found that most heads of households had little knowledge about agriculture and held negative perceptions about the impact of agriculture. In addition, a study conducted in Texas (Terry, Herring & Larke, 1992) concluded that teachers have inaccurate perceptions and limited knowledge of agriculture.

The ways that information is communicated among people has changed dramatically over the course of the past 50 years. Today, television is considered to be the most credible source of news and information by most people (Television Information Office, 1987). Because of this fact, the influence of that medium, and the people who work in it, must be considered in relation to the agricultural literacy issue.

There are numerous examples of how television reports have painted inaccurate, and less than flattering pictures of agriculture. According to Simon (1990), almost every television story about natural resources has erroneously announced bad news. As an example, he stated, "The reporting on American farmlands ... has consistently hammered on the false theme of its immanent disappearance and avoided the good news of its ample availability" (p.27). To the contrary, environmental extremists have been able to promote their causes through the media with sensational reports based upon false pretenses (Arnold, 1990). Compounding this situation, Taylor (1993) stated that reporters provide editorial comments concerning the stories they do, solely based upon their personal opinions with little regard to attribution.

The influence of television upon the general public and the nature of news reporting has changed in recent years. Reporters have more latitude to say what they think, rather than simply report what happened (Matelski, 1991). Due to this fact, it is important for agricultural educators and communicators to evaluate television reporters understanding of and perceptions about agriculture and how they influence their reporting of agricultural news.

PURPOSES AND OBJECTIVES

The purpose of this study was to determine the awareness and perceptions about agriculture of television reporters in Texas. The following specific objectives were formulated to accomplish the purpose:

1. Identify selected personal and professional characteristics of television reporters in Texas.
2. Assess the reporters' knowledge and perceptions about agriculture.
3. Evaluate the reporters' interest in reporting agricultural news.
4. Determine relationships between and among personal and professional characteristics, knowledge about agriculture, perceptions about agriculture, and interest in reporting agricultural news.

METHODS AND PROCEDURES

The population of this study was all reporters working for television stations in Texas in 1993. There was estimated to be a total 150 reporters employed at the 52 stations located in Texas. The population size was estimated using procedures recommended by faculty in Telecommunications in the School of Mass Communications at the researcher's university.

The sample was selected by conducting a cluster census. Since there was no directory listing the names of all television reporters in Texas, a cluster technique, using television stations in Texas as the clusters, was determined to be the most appropriate method to draw the sample. Because of the relatively low number of television stations in the state, a census of the stations was conducted rather than a sampling. The most current list of television stations was found in the Broadcasting and Cable MarketPlace 1992, (Bowker, 1992) formerly known as the Broadcasting Yearbook. One reporter at each station was randomly selected to participate in the study.

The instrument used to collect the data was a questionnaire designed by the researcher. Part I consisted of 12 open-ended questions designed to assess the reporters' general knowledge of agriculture. Part II was developed to determine the reporters' perceptions about agriculture using a five-point Likert-type scale for response choices. Part III was composed of open-ended questions and items with yes/no response choices to identify personal and professional characteristics of the reporters.

Validity and reliability of the instrument were assessed by a panel of experts from the Department of Agricultural Education and Communications and the Telecommunications program at the researcher's university. A pilot test was conducted using reporters from television stations in Oklahoma. Following data collection, Cronbach's alpha was calculated on the appropriate parts of the instrument to measure reliability. Part I was found to have an alpha of .70 and Part II had an alpha of .86.

Data were collected by telephone in accordance with procedures suggested by Dillman (1978). A student majoring in agricultural communications was hired to administer the questionnaire by calling each of the 52 television stations and asking to speak to one of the reporters. Thus, the reporter responding was randomly selected. Forty usable responses were secured from the sample of 52 reporters contacted, yielding a response rate of 77%.

Statistical analysis was performed using SPSS® for the Macintosh® computer. Means, modes, median, and standard deviations were calculated for each variable, and relationships between variables was calculated using Pearson's product moment . Analysis of variance (ANOVA) was used to determine significant differences between groups. Probability of < .05 was used to determine statistical significance on all tests. The scale suggested by Davis (1971) was used to describe correlation relationships.

RESULTS

The 40 respondents represented all geographic areas of the state and all sizes of markets for television stations. Seventy percent of the reporters were male, and the majority (62.5%) were from hometowns with populations of more than 50,000. Thirty percent of the reporters worked for a station in one of the metropolitan areas of Texas (Austin, Dallas, El Paso, Ft. Worth, Houston, and San Antonio). The mean number of years they had been in their television career was slightly more than 5 with 90% having less than 10 years experience. One-fourth of the reporters worked a beat that was related to agriculture, and almost one-third were or had been members of one or more agricultural organizations. Eighty percent majored in communications or journalism in college, and 25% had taken one or more agriculture courses in high school or college (see Table 1).

Table 1. Personal and Professional Characteristics of Television Reporters

Characteristic	Frequency*	Percent
Gender		
Male	28	70.0
Female	12	30.0
Station Market		
Metro Area	12	30.0
Non-Metro	28	70.0
Population of Hometown		
Farm or Ranch	1	2.5
Rural, Not Farm or Ranch	3	5.0
Small Town < 5,000	5	12.5
Large Town 5,000 - 10,000	1	2.5
Small City 10,000 - 50,000	2	5.0
Large City 50,000 - 1 million	22	45.0
Metropolitan > 1 million	7	17.5
College Major		
Journalism/Communications	32	80.0
Agriculture	2	5.0
Agricultural Communications	1	2.5
Other	5	12.5
Years in Career (mean = 5.8 years)		
≤2 years	9	22.5
3 - 5 years	15	37.5
6 - 9 years	9	22.5
10 - 15 years	4	10.0
>15 years	3	7.5
Regular Reporting Beat		
Agriculture and Related Areas	10	25.0
Not Agriculture	30	75.0
Organizational/Educational Affiliation		
Agricultural organizations	13	32.5
Ever taken courses in agriculture	10	25.0
Environmental and animal rights organizations	3	7.5

* N=40 for each characteristic

The test of knowledge about agriculture included twelve questions primarily concerning the contribution of agriculture to society and the economy and commodities grown in the state. Correct answers for each item on the assessment were worth two points for a total of 24 points possible. One point was awarded for responses that were reasonably close to the correct response. The questions, with their correct answers, including the frequency of accurate responses and the modal response, is shown in Table 2.

Table 2. Responses to Questions on Test of Agricultural Awareness

Item *Correct Answer*	f Correct	Percent Correct	Mode Response
What percent of US population earns its living from farming/ranching? - *≤ 2%*	2	5.0	Don't know
What percent of US GNP comes from agriculture? - *20%*	1	2.5	Don't know
What percent of the US work-force is employed in the agricultural industry? - *20 - 25%*	4	10.0	Don't know
How many dollars were generated by agriculture in Texas last year? - *$11 Billion*	1	2.5	Don't know
Does agriculture help reduce or increase the US trade deficit? - *Reduce*	29	72.5	Reduce
What percent of the average American's income is spent on food? - *10 - 15%*	6	15.0	Don't know
Compared to all other states, where does Texas rank in dollars generated? - *#2*	7	17.5	Don't know
If previous answer was not #1, what state ranks 1st in dollars generated? - *California*	12	30.0	Don't know
Texas leads the nation in the production of what four major commodities? - *Cotton*	32	80.0	Cotton
- *Beef*	19	47.5	Beef
- *Wool*	1	2.5	Don't know
- *Mohair*	1	2.5	Don't know

As illustrated in Figure 1, the reporters' scores ranged from one to 17 with a mean of 6.6 points. More than half of the respondents (22) provided 6 or fewer correct answers. Fewer than 93% scored less than half the 24 points possible. No reporters were in the upper quartile of points possible.

The most common response to most questions was "I don't know." On only three questions did more than 30% of the reporters get the correct answer. Four out of every five

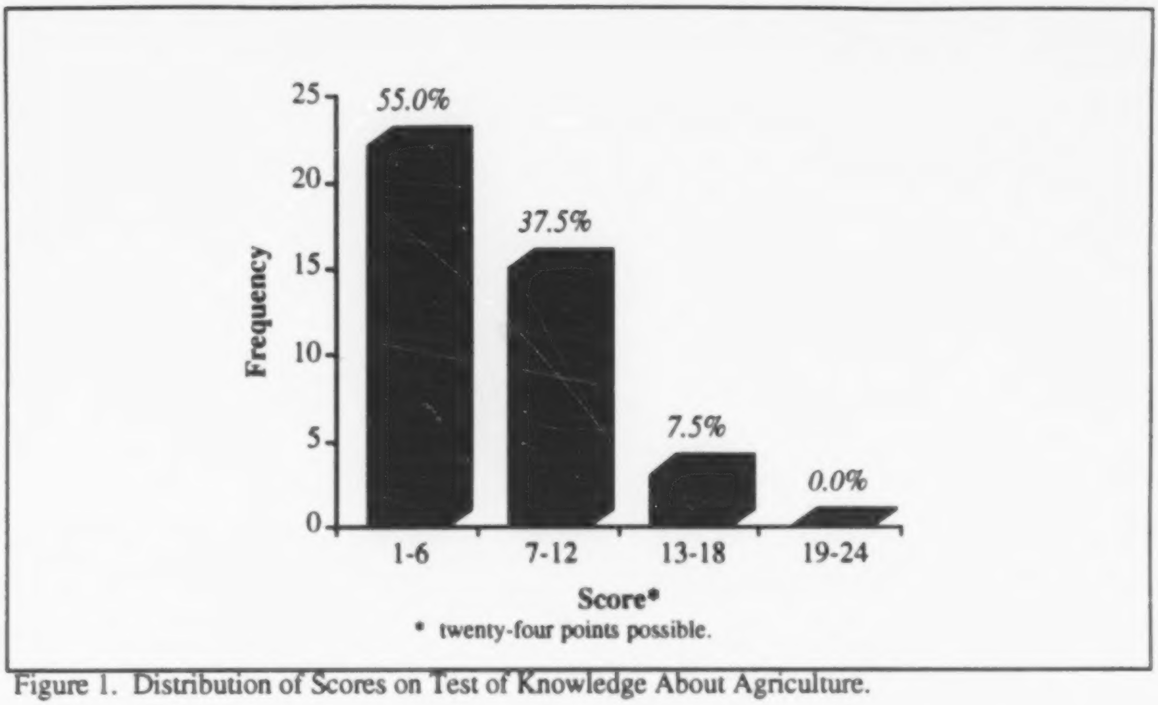

Figure 1. Distribution of Scores on Test of Knowledge About Agriculture.

reporters knew that Texas leads the nation in cotton production, and nearly half knew the state leads the US in the production of beef cattle. Nearly three-fourths knew that agriculture helps to reduce the US trade deficit, but only 5% knew that about 2% of the US population earns its living from farming and ranching. Only one reporter knew that 20% of the gross national product for the US comes from agriculture, and only one knew that Texas leads the nation in the production of wool and mohair.

Reporters were asked questions to determine their perceptions about agriculture in regard to societal impact, environmental impact, food safety, animal welfare, and nutrition and health. The mean responses for the group on all but one of the items were above 3.0, meaning the respondents had a generally positive perception of each of the aspects investigated.

The reporters strongly agreed that agriculture is an important contributor to our economy. However, they disagreed with the statement that farmer assistance programs do not cost too much. The respondents were neutral/undecided about there being abundant career opportunities in agriculture for young people.

Overall, the reporters agreed that agriculture has a positive impact upon the environment and that people in agriculture are good caretakers of the environment. Their response to the statement concerning the positive benefits of biotechnology for the food and fiber system bordered between agree and neutral/undecided. They were less positive on the statements about animal welfare. Their responses to the statements about humane treatment of animals used for food and animals used for leisure fit into the neutral/undecided range while they agreed that companion animals are treated humanely.

The reporters agreed that food is safe to eat. When compared to fruits and vegetables and poultry products, the reporters agreed to a lesser degree that red meat is safe to eat. While the group agreed that fruits and vegetables and poultry are healthy to eat, they were neutral/undecided about whether or not red meats are healthy to eat. Table 3 summarizes these data.

As stated earlier, only 25% of the respondents indicated they were assigned to cover agriculture and agriculturally related beats. However, only three of the respondents stated that they had covered no stories on agriculture in the last year. The range of number of agriculture stories reported was from 0 to 1500, and the mean was more than 83. Of perhaps more significance was the mode of 5 stories per year and the median of 10 stories per year. These data are displayed in Table 4.

More than three-fourths of the reporters indicated they like to report stories about agriculture and, 75% feel qualified to report stories in that area. When asked if they would be interested in participating in a media workshop for television reporters, 35 of the 40 reporters answered in the affirmative (see Table 5).

Analysis of variance (ANOVA) was conducted to measure if variance in knowledge about agriculture could be attributed to differences in specific personal and professional characteristics of the reporters. For this phase of analysis, the variable "population of hometown" was re-coded to fit into four categories rather than seven. The groups were: Rural (composed of farm or ranch and country--not farm or ranch); Town < 5,000 - 10,000; City 10,000 - 1 million; and, Metropolitan

Table 3. Perceptions Related to the Impact of Agriculture Upon Society

Category Item	Mean*	sd
Societal Impact		
There are abundant career opportunities of young people in agriculture	3.2	1.2
Agriculture is an important contributor to our economy	4.5	0.9
Farmer assistance programs do not cost taxpayers too much	2.4	1.1
The US has an abundant supply of food and fiber	3.7	1.1
Environmental Impact		
Agriculture has a positive impact upon the environment	3.7	1.0
People who work in agriculture are good caretakers of the environment	3.8	0.9
Biotechnology will be good for the food and fiber system in the United States	3.5	0.9
Animal Welfare		
Animals used for food are treated in a humane way	3.4	1.1
Animals used for leisure activities such as rodeo and horse racing are treated in a humane way	3.1	1.1
Companion animals such as dogs, cats, and birds are treated in a humane way	3.6	0.8
Food Safety		
The US food supply is safe to eat	3.98	0.9
Fruits and vegetables are safe to eat	4.03	0.8
Poultry products are safe to eat	3.85	0.8
Red meats are safe to eat	3.66	1.0
Health and Nutrition		
Fruits and vegetables are healthy to eat	4.6	0.7
Poultry products are healthy to eat	4.2	0.9
Read meats are healthy to eat	3.2	1.0

* Scale: 5 = strongly agree; 4 = agree; 3 = neutral/undecided; 2 = disagree; 1 = strongly disagree.

Table 4. Number of Agricultural Stories Reported per Year

Number of Stories*	Frequency	Percent
0	3	7.5
1 - 10	19	47.5
11 - 20	6	15.0
21 - 30	3	7.5
30 - 50	2	5.0
> 50	7	17.5

* Range = 0 - 1500; Mean = 83.83; std. dev. = 255.88; Mode = 5.00; Median = 10.00.

Table 7. Summary of Analysis of Variance for Perceptions About Agriculture

Source	df	Sum of Squares	f	f Prob.
Gender				
Factor	1	92.71	1.13	.30
Error	38	3177.13		
Population of hometown				
Factor	3	443.11	1.88	.15
Error	36	2826.67		
Major in college				
Factor	2	631.43	4.43	.02[a]
Error	37	2638.34		
Member of agricultural organization(s)				
Factor	1	326.49	4.22	.04[b]
Error	38	2943.29		
Location of station				
Factor	1	92.67	1.11	.29
Error	38	3177.11		
Beat				
Factor	1	735.08	11.02	.00[c]
Error	38	2534.70		

[a] post hoc test identified perception of agriculture majors significantly higher ($p<.05$) than communications/journalism or other majors.

[b] perception of members of agricultural organizations significantly higher ($p<.05$) than reporters not in any agricultural organizations.

[c] reporters assigned to cover agriculture and related areas perception higher ($p<.05$) than reporters assigned to cover other beats.

6. Factors such as gender and the location of the place of work have no effect upon the knowledge about agriculture and perceptions about agriculture of television reporters.

7. Structured experiences through education and participation in agricultural organizations have a positive effect upon the knowledge about agriculture and perceptions about agriculture of television reporters

RECOMMENDATIONS

1. Because of the reporters' interest in participating in a media workshop, agricultural educators should develop and conduct such activities focusing upon factual information about agriculture and effective methods of reporting stories about agriculture.

2. While many agricultural literacy initiatives have been primarily directed toward school aged children and teachers, programs should also be conducted to reach adults in the general populous. Due to the inadequate knowledge about agriculture held by television reporters, this group cannot be relied upon to provide accurate information about agriculture.

3. Representatives of agriculture, including educators, should make themselves available as resource persons for television reporters preparing stories about agriculture. Further, agricultural researchers should use the television medium to promote the findings of their work.

Table 6. Summary of Analysis of Variance for Knowledge About Agriculture

Source	df	Sum of Squares	f	f Prob.
Gender				
Factor	1	12.13	.90	.35
Error	38	556.25		
Population of hometown				
Factor	3	150.33	4.30	.01[a]
Error	36	419.05		
Major in college				
Factor	2	132.36	5.60	.01[b]
Error	37	437.02		
Member of agricultural organization(s)				
Factor	1	123.16	10.49	.00[c]
Error	38	446.21		
Location of station				
Factor	1	.27	0.02	.89
Error	38	569.11		
Beat				
Factor	1	33.08	2.34	.13
Error	38	536.38		

[a] post hoc test identified reporters from rural hometowns score significantly higher ($p<.05$) than reporters from larger hometowns.

[b] post hoc test identified score agriculture majors significantly higher ($p<.05$) than reporters who majored in communications/journalism or other fields.

[c] reporters assigned to cover agriculture and related areas score higher ($p<.05$) than reporters assigned to cover other beats.

CONCLUSIONS

1. Most television reporters have had little personal or professional contact with agriculture and do not have the background characteristics or educational and organizational experiences normally associated with agriculturally literate persons.

2. While most television reporters like reporting news about agriculture and feel qualified to do so, few have the technical knowledge and appropriate understanding about agriculture to accurately inform the public about the industry.

3. While television reporters have overall favorable perceptions about agriculture they have more favorable perceptions about the safety and healthiness of fruits and vegetables as well as poultry than they do about red meats.

4. Although only one-fourth of the television reporters are assigned to normally cover agriculture, almost all reporters do cover some stories about agriculture in their normal duties.

5. The vast majority of television reporters are interested in learning more about agriculture and would participate in a workshop to do so.

Table 5. Other Aspects Concerning Reporting Agricultural News

Item	Frequency*	Percent
Like to report news about agriculture and related subjects	31	77.5
Feel qualified to report news about agriculture and related subjects	30	75.0
Would be interested in participating in a media workshop or seminar about agriculture	35	87.5

* N = 40 for each item

> 1 million. The variable "college major" was re-coded from four groups to three. Agricultural communications was merged with agriculture. Results involving population of hometown and college major should be interpreted with caution. Even after recoding, some response categories had low frequencies.

As shown in Table 6, no significant differences in knowledge were detected based on gender, location of station, or beat. However, reporters from homes in the country had significantly greater knowledge than did their counterparts from more populous hometowns as did agriculture majors compared to reporters who did not major in agriculture in college. Reporters who had been or were currently members of agricultural organization(s) had significantly greater knowledge than did non-members.

The ANOVA procedure was repeated using perceptions about agriculture as the dependent variable and the same independent variables as stated above. The 17 items in Part II of the instrument were summed to calculate a perception score for this analysis.

Neither gender, population of hometown, or location of station attributed to significant differences in perceptions about agriculture. Significant differences were attributed to major in college, membership in agricultural organization(s), and beat. Agriculture majors, members of agricultural organization(s), and reporters assigned to cover agriculture had significantly higher perceptions than did their counterparts. These data are summarized in Table 7.

4. Young people with interests and experiences in agriculture and communications should be encouraged to use their skills to accurately communicate information about agriculture to the public.

5. A study similar to this one should be conducted using a larger population such as all television reporters in the US or all television reporters in a region of the US. With a larger population, there would be a higher frequency in each response category of all variables, thus providing more useful data.

6. A study similar to this one should be conducted with the population of print media reporters and should also evaluate the influence of source credibility upon reader perceptions about agriculture.

7. Research should be conducted to evaluate the technical accuracy of news reported about agriculture and its effect upon the knowledge and perception of television viewers.

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UNDERSTANDING AND PERCEPTIONS ABOUT AGRICULTURE OF TELEVISION NEWS REPORTERS

A CRITIQUE - BY JAMES P. KEY, OKLAHOMA STATE UNIVERSITY

The researcher is to be commended for choosing a topic which can have significant impact on agriculture and the way the public views agriculture. Television news reporters are the eyes and ears for much of the general public. Their knowledge and understanding of agriculture directly affect the public's knowledge and understanding of agriculture because the news reporters interpret any news concerning agriculture to the public. The findings were extremely well presented, with clear tables and narrative indicating the news reporters had limited knowledge about agriculture. However, they did indicate the reporters had a fairly positive attitude toward agriculture. The recommendation that the news reporters participate in a media workshop over agriculture was quite appropriate. The news reporters' interest in such a workshop was especially heartening.

This study had a well developed theoretical framework. Although short and to the point, it adequately developed the theory base and pointed out the logical relationships which led to the problem, and the study to help solve the problem. The purpose and objectives were clearly stated and agreed with the title and problem. The methods and procedures were well thought out and adequate for the achievement of the objectives. The panel of experts and pilot test used in the instrument development are to be commended. Internal consistency was determined to be adequate through Cronbach's alpha. The use of a telephone survey produced a high response rate (77%). Statistical procedures appeared to be adequate, although small numbers in some categories and unequal size groups could call into question some of the analysis of variance comparisons. The researcher acknowledged this, but chose to present the comparisons and let the reader decide if they were meaningful. The measured significant relationships supported logical expectations of relationships with organizations and activities connected with agriculture.

One of the real contributions of this paper was the presentation of the perceptions of the news reporters related to the impact of agriculture upon society. This represented new information, evidently not reported in other studies. It was noteworthy that the vast majority of their perceptions were positive. Since the vast majority were also interested in learning more about agriculture, this presents a unique opportunity for telling the agriculture story to the general public through these news reporters. The media workshop, as recommended needs to be developed. Although not statistically correct to generalize to other states, it is logical to assume that news reporters would be quite similar in other states and that the opportunity exists nation wide to improve the image of agriculture through workshops in various states for these news reporters.

STRATEGIES FOR IMPROVING AGRICULTURAL LITERACY AND SCIENCE PROCESS SKILLS OF URBAN FIFTH AND SIXTH GRADERS IN THE LOS ANGELES UNIFIED SCHOOL DISTRICT

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Introduction

As fewer people live on farms, generations of Americans are growing up without a basic understanding of agriculture. When asked where food comes from, children are likely to respond, "the store". In 1988, the National Research Council (NRC) released the study Understanding Agriculture: New Directions for Education. The study identified the term "agricultural literacy," and stated that " beginning in kindergarten and continuing through twelfth grade, all students should receive some systematic instruction about agriculture" (p. 2). The NRC study pointed to the value of agriculture in teaching critical thinking skills, and fostering improved science education.

The NRC report offered a broad definition upon which most research on agricultural literacy has been based:

> An agriculturally literate person's understanding of the food and fiber system would include its history and its current economic, social, and environmental significance to all Americans. This definition is purposely broad, and encompasses some knowledge of food and fiber production, processing, and domestic and international marketing. As a complement to instruction in other academic subjects, it also includes enough knowledge of nutrition to make informed personal choices about diet and health. Agriculturally literate people would have the practical knowledge needed to care for their outdoor environments, which include lawns, gardens, recreational areas and parks (pp 8-9).

Literature Base

Several studies have been conducted on agricultural literacy. Thus far, research has measured agricultural literacy among students and teachers in several states, including Kansas (Horn & Vining, 1986), Texas (Terry, Herring, & Larke, 1990), and Virginia (Bowers & Kohl, 1986). The results are unanimous: Even rural youth and teachers know very little about agriculture. The status of agricultural literacy among urban youth is even more dismal.

At the same time that the agricultural community is looking for opportunities to re-introduce young people to the world of agriculture, elementary school teachers are seeking ways to increase opportunities for hands-on learning in science (Roth & Roychoudhurry, 1993). The science framework for California public schools (California Board of Education, 1990) recommends that at least 40% of science teaching take the form of hands-on activities.

According the framework, and the body of research in science education, children learn most effectively through hands-on, experiential activities. Hands-on projects are particularly effective in improving science process skills. Science process skills, which include observing, communicating, comparing, ordering, relating, and inferring are the building-blocks of critical thinking and inquiry in science.

Since agriculture is by nature a hands-on discipline, it would seem to be a perfect match for science education. Agricultural literacy research must now enter a new phase. It is clear that the agricultural literacy level of our youth must be raised. But how is this best accomplished? How can agricultural literacy best be tailored to improve children's science skills? Little to no research has been conducted on what methods are helpful in promoting both agricultural literacy and science education.

Purpose and Objectives

This study set out to assess two types of hands-on activities in improving students' agricultural literacy and basic science skills. The following research objectives were developed to provide focus for the study:

(1) To determine what urban children in Los Angeles know about agriculture;

(2) To ascertain whether participating in a series of short in-class projects (such as bread baking, chick rearing, and seed germination) or from conducting an ongoing project such as planting and maintaining a vegetable garden increases student knowledge of agriculture; and

(3) To determine if science process skills increase as students learn about agriculture through hands-on projects.

Procedures

The study was conducted at two urban, inner-city Los Angeles schools in spring of 1993. One school located in East Los Angeles had a student population of 99% Latino. The other school located in South Central Los Angeles had a student population that was 75% African-American and 25% Latino.

Five differing fifth grade, sixth grade, or fifth/sixth combination classrooms were self-selected to participate in the study. These groups were then assigned to the following treatments: (1) a ten week garden project consisting of a fifth/sixth combination class and a sixth grade class, (2) a ten week series of three short in-class projects (including bread-baking, chick-rearing, and seed germination) for two of the fifth grade classes, and (3) one control group, a fifth/sixth combination classroom. A total of 147 children participated in the study.

Students in all groups received a pretest and posttest to measure both agricultural literacy and science process skills. The test of agricultural literacy was developed by the researchers and reviewed for validity by a panel of experts. This test included an open-ended question, "What is agriculture?" as well as several matching and multiple choice questions. The agricultural literacy instrument was designed to find out how much children knew about where food comes from, their level of awareness of careers in agriculture, and their understanding of agriculture's social, economic and environmental significance.

The test of science process skills was adapted from the book "Science Process Skills: Assessing Hands-On Student Performance," (Ostland, 1992). This was a hands-on assessment in which students were provided with both popped and unpopped popcorn. They were asked to describe and compare the two (which tested observing, communicating, and comparing skills). They were asked to draw the steps for making popcorn (relating, ordering, communicating). They were asked to hypothesize about what makes popcorn pop (relating and inferring). They were asked to group ten items (for example, a rubber band, an orange, a penny, a cracker, etc.) according to what they thought the different items had in common (ordering).

After review by a panel of experts for the purpose of establishing content and face validity, the instruments were slightly revised. Both instruments were piloted-tested with fifth graders at another inner city Los Angeles school. Kuder-Richardson 20 reliability coefficients were used to assess the reliability of the knowledge questions that were scored dichotomously. The resulting coefficients were .58 for the science process instrument and .74 for the agricultural literacy instrument.

A researcher administered the pretest and posttest, and taught the 10-week lesson series. Lessons were one hour each week for the ten week period, and combined approximately 10 minutes of lecture with 40 minutes of hands-on activities which illustrated the days' discussion. During the hands-on portion of the lesson, students had many opportunities to practice and improve their science process skills. Students kept a journal of their activities over the course of the project.

The research design was descriptive-comparative. Great care was taken when evaluating the students' work to ensure intrarater reliability. Data was analyzed using the SPSS+/PC statistical package. Due to the qualitative nature of many of the questions, inferential statistics were not utilized to determine significant differences.

Results

Agricultural Literacy

The students who participated in this study appeared to know little more about agriculture than students in earlier studies conducted in Kansas, Virginia, and Texas. When asked "What is agriculture?" on the pretest only 32% of students in the control group, 21% of students in the garden group and three percent of students in the short projects group could give a basic definition (Table 1). Most students answered "I don't know." Some other answers included, "I think agriculture is when someone doesn't like a person's color," "It is the way other people live. Besides us, " and "It goes back a long time ago to the Indians".

After participating in the ten-week program, many more students were able to answer the question with some accuracy. While only 43% of control group respondents gave an appropriate response (11% increase from pretest scores), 91% of participants in the garden group (70% increase), and 83% of the students in the short projects group (80% increase) gave acceptable answers. Examples of posttest responses to the question "What is agriculture?" included "Agriculture is when farmers grow crops and plants that the world needs to be healthy," "Agriculture is the way we grow our food and what we use to grow it," and "It is like farming food and selling the food to stores."

The students tested showed little understanding of the economic importance of agriculture in their state. On the pretest, 42% of control group students, 25% of garden group students, and 36% of short project students knew that California was the nation's leading farm state. On the posttest, 50% of control respondents (eight percent increase from pretest scores), 78% of garden respondents (53% increase), and 78% of short project respondents (42% increase) were aware of their state's status in agriculture.

In a similar vein, students were asked to list three crops that grow on California farms. Considering the diversity of agriculture in the state, almost any fruit, vegetable, or type of livestock would have been acceptable. On the pretest, only 39% of control group respondents, 16% of garden group respondents and 30% of short project respondents could list three California crops. Although there was no change in the control group, 54% of garden group participants (38% increase from pretest scores), and 50% of short project participants (20% increase) were able to list three crops grown by farmers in California.

Most students were unfamiliar with important terminology in agriculture, even of words such as "drought" and "medfly" that are very common in the students' urban environment. They were largely unfamiliar with a list of careers relating to agriculture, including forester, entomologist, landscape architect, dairy farmer, and plant breeder. Both methods of instruction seemed useful in raising their awareness.

What the students did understand was the agricultural origin of most common food and fiber products. Most students were aware that tortillas come from corn, bacon comes from pigs, tee-shirts come from cotton, and wool blankets come from sheep.

Did students think agriculture was interesting? Although so many students did not understand the meaning of the word on the pretest, a surprising number answered "yes" to the question "Is agriculture interesting?" (Perhaps thinking that this was the "right" answer). Sixty-nine percent of control-group participants, 45% of garden group participants and 42% of short project participants said that agriculture was interesting on the pretest. On the posttest, the percentage of "yes" respondents in the control group declined to 54% (-15% decrease), and increased to 83% in the garden group (38% increase), and 85% in the short projects group (43% increase). Students had the option of adding a comment about why it was interesting or not interesting to them. Answers included, "It was fun", "it made science interesting", and "I liked going outside, and I liked the plants," and an occasional, "It was boring!"

Science Process Skills

The hands-on assessment of science process skills set out to evaluate the students' skills of observation, communication, comparison, ordering, relating and inferring. Children were provided with a piece of popped and a piece of unpopped popcorn. First, they were asked to describe the piece of popped popcorn, by its shape, color, texture, smell, etc.. They were then asked to describe the kernel. This exercise tested their skills in observing and communicating. Almost all children in all groups could complete this activity easily on the pretest. However, on the posttest it seemed that many children's powers of observation, or ability to communicate their observations, had improved. On the pretest one student wrote "the kernel of corn is yellow and small", while on the posttest, the response became more detailed, "it is orangey-yellow, shaped like a tear, hard, and 1/4" long". Forty-six percent of the control group, 55% of the garden group, and 62% of short project group respondents improved in this way.

The students were also asked to compare popped popcorn to a kernel of unpopped popcorn, and describe their difference. This activity sought to measure the students' skills in comparing. Again, while the students handled the task easily on the pretest, their posttest efforts at comparing the kernel and the popcorn were often more detailed. For example, one child wrote on the pretest "the popcorn is white and the kernel is yellow". On the posttest, he wrote "the popcorn is soft, white, shaped like a cloud but the kernel is much harder, and smaller and yellow. One is popped and the other is not popped. One is good to eat, the other is no good to eat." Twenty-seven percent of the control group, 48% of the garden group, and 53% of the short projects group showed improvement in their ability to compare the two items.

The students were then asked to "draw pictures that show someone how to make popcorn." This exercise tested the science process skills of ordering and relating, and was somewhat more difficult for the students. Everyone knew how to make popcorn, whether on a stove or in a microwave, but some children found it difficult to break the process down into distinct steps (Table 2). Seventy-four percent of the control group, 64% of the garden group, and 46% of the short projects group were able to draw a logical series of steps for making popcorn on the pretest. On the posttest, 64% of the control group (10% decline

Table 1

Selected Results from the Tests of Agricultural Literacy (n = 147)

	Control Group (% Correct)			Garden Group (% Correct)			Short Projects Group (% Correct)		
	Pretest	Posttest	Net Change	Pretest	Posttest	Net Change	Pretest	Posttest	Net Change
What is Agriculture?	32	43	+11	21	91	+70	3	83	+80
What is the leading farm state?	42	50	+ 8	25	78	+53	36	78	+42
Name 3 crops raised on California Farms	39	39	0	16	54	+38	30	50	+20
Agriculture Interesting?	69	54	-15	45	83	+38	42	85	+43

Table 2

Selected Results from the Tests of Science Process Skills (n=147)

	Control Group (% Correct)			Garden Group (% Correct)			Short Projects Group (% Correct)		
	Pretest	Posttest	Net Change	Pretest	Posttest	Net Change	Pretest	Posttest	Net Change
Draw steps for making popcorn	74	64	-10	64	84	+20	46	65	+19
What makes popcorn pop?	68	64	- 4	71	79	+ 8	60	79	+19
Group the items	49	50	+ 1	42	79	+37	35	80	+45

from pretest scores), 84% of the garden group (84% increase), and 65% of the short projects group (19% increase) could complete the activity.

Students were then asked, "What do you think makes popcorn pop?" This question challenged students to use their skills of inference. On the pretest, 68% of the control group, 71% of the garden group, and 60% of the short projects group were able to state that heat had something to do with the popping process. There was some gain on the posttest for the students in the two treatment groups. Sixty-four percent of the control group (four percent decline from pretest scores), 79% of the garden group (8% increase), and 79% of the short projects group (19% increase) could answer the question with some accuracy.

More dramatic improvements came with the activity in which each student grouped 10 items in a "mystery bag" according to what each he or she felt the items had in common. This activity tested skills in ordering and categorizing, and students seemed to find it quite challenging. On the pretest, 49% of the control group, 42% of the garden group, and 35% of the short projects group could complete the activity. On the posttest, 50% of the control group (1% increase from pretest scores), 79% of the garden group (37% increase), and 80% of the short projects group (45% increase) were able to carry out the exercise successfully.

Conclusions and Recommendations

The researchers acknowledge that the results of this study must be interpreted with caution. Due to the nature of the low internal consistency of both instruments a great deal of error was possibly introduced into the results of the study. In addition, projecting these findings to populations other than the schools purposefully selected for this study presents an external validity threat.

The urban fifth and sixth graders participating in this study knew very little about agriculture before completing a ten-week series of hands-on activities. Very few children could give a basic definition of the word agriculture itself. Students for the most part could not name crops grown by farmers in their state. They were unfamiliar with agriculturally-related careers, and common agricultural terminology, such as irrigation, pesticides, and drought.

The students' agricultural literacy increased through participation in the activities. Many more students were able to define agriculture, list crops grown in their state, and identify related careers. Students went from knowing very little to becoming quite knowledgeable.

Improvements in science process skills, while not as dramatic, were also marked. Participating in the program seemed to help students in their ability to describe, communicate, compare, relate, order and infer. By improving these critical thinking skills, students may become better consumers of scientific knowledge in the future. They possibly will become better able to question, hypothesize and make educated conclusions based on their observations.

Both the garden project and the short projects seemed to be beneficial methods for improving student skills. Students in the short projects group may have improved somewhat more than those in the garden group, particularly in the area of science process skills. This may be due to the fact that a garden project really takes longer than the allotted ten weeks to complete, while the short projects (which included bread-baking, chick hatching, and seed germination) were all completed quickly.

Based on this research, teachers should seriously consider introducing some hands-on agriculture activities into their science curriculum. The method they select can be based on their own preference, or that of the students. Some teachers may prefer gardening as it gets the students outside, and can be used as a focal point throughout the school year for studying science, math, and social studies. Other teachers might prefer the shorter time frame, and lesser responsibility, of conducting in-class projects.

However one chooses to accomplish the goal, it is critical to ensure that today's youth grow up with a basic understanding of agriculture. People should be capable of making educated decisions on agricultural issues in the voting booth as well as in their personal lives. And more importantly, agriculture has tremendous, largely untapped potential to teach critical thinking skills and foster improved science education.

Agricultural literacy should be a part of every child's education, starting in kindergarten and continuing through high school. Agricultural concepts may be most appropriate as part of school science curriculum. To be a valuable part of science education, agricultural activities should be hands-on to the greatest degree possible.

Unfortunately, many existing agricultural literacy programs place very little emphasis on hands-on activities. Lesson plans focus on crossword puzzles and fill-in-the-blank worksheets. In this format, agriculture seems to lose the very qualities that make it exciting.

If the agricultural community truly wants to make agriculture a meaningful part of education, it must look closely at how to make agricultural material more valuable to children. How can agriculture best be used to help generate excitement for learning? How it be used to make science and other curricula come to life, and help children develop critical thinking skills? Hopefully, future research will look closely at these issues.

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STRATEGIES FOR IMPROVING AGRICULTURAL LITERACY AND SCIENCE PROCESS SKILLS OF URBAN FIFTH AND SIXTH GRADERS IN THE LOS ANGELES UNIFIED SCHOOL DISTRICT

A CRITIQUE - BY JAMES P. KEY, OKLAHOMA STATE UNIVERSITY

This study is to be commended for going beyond the measurement of agricultural literacy, to testing ways of increasing that literacy. The target groups of this study were also, commendable, Latino and African-American fifth and sixth grade, urban, inner city students. These students probably have the least opportunity to be agriculturally literate of any students. The inclusion of the teaching and measurement of critical thinking skills, along with the applied science approach, added greatly to the study and the project. The concepts of agriculture as an applied science, hands-on learning as an effective teaching method and critical thinking as a basis for science, all greatly enhance this study's contribution to agricultural education. Although this study was done on a relatively small scale, three classes, the solid increases in knowledge about agriculture and critical thinking skills should encourage the implementation of this approach on a larger scale to determine its wider generalizability and utility.

This study had a short, but sound theoretical framework establishing the basis for the study. The purpose and objectives were clearly stated and adequately gave direction to the study. The procedures were well designed to accomplish the objectives of the study. The sample was purposive (self-selected), which is the case many times when research is conducted in the actual setting - the public schools. Although not generalizable statistically, the findings are more realistic and perhaps more logically generalizable in the long run. The instruments were researcher-developed with a panel of experts and pilot test used to validate and refine them. One of the researchers taught the 10 week lesson series. This adds stability to the study as the same teacher taught two of the classes. It was not clear whether that teacher taught the control group also. A drawback to this approach, since the researcher also developed the test, could be teaching to the test, either inadvertently or purposely.

The results were clearly presented using concise tables and illustrated narrative. Effective use was made of percentages as data reporting tools to achieve comparability with unequal size classes. Illustrations and examples in the narrative added insight into the meaning of the data. Conclusions and recommendations were well supported by the data. They indicated that notable changes in knowledge of agriculture and creative thinking skills took place in the two project classes, which should be good reason for considering hands-on agriculture activities in the science curriculum. Not only does this approach provide additional knowledge about agriculture, it develops critical thinking skills, necessary in science endeavors.

AGRICULTURAL AWARENESS IN ARIZONA

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Introduction

As the vast majority of the population in the United States approaches a point in time that is fully two generations removed from any on-farm experience, another problem has been identified by agricultural educators that has potentially far reaching negative implications for agriculture as a whole. That problem has been identified as "agricultural literacy," (National Academy of Science [NAS], 1988), or more explicitly a lack thereof, in the general populace.

The transistion from a rural to an urban concentration in population not only left rural America in disarray economically, but also left behind a knowledge base about agriculture that becomes further removed from the vast majority of Americans over time. Today that loss of knowledge translates into a population that is ill equipped to make informed decisions about food and fiber in their personal lives (Mayer & Mayer, 1974; NAS, 1988; & Tisdale, 1991). More importantly for agriculture, the loss of knowledge means that a poorly informed public majority has input in policy decisions that may affect the agricultural industry's ability to function efficiently in an increasingly competitive world market (NAS, 1988). Much of the information that the public receives by which they base their personal and policy decisions is misconceived and often selectively incomplete, as demonstrated by the "Alar" apple scare of the 1980's

(Ames, 1989; EPA, 1989; Evans, 1989; & Moore, 1989). The communication of agricultural information that is clear, concise, and complete is necessary for the population to make informed personal and public decisions.

With the approach of the 21st century, critical decisions must be made, in a timely manner, concerning the dissemination of agricultural information in modern day America, both within and outside of the agricultural community. In a time when the efficacy of both educational and agricultural methods, procedures, systems, and goals are under close scrutiny (NAS, 1988 & National Commission on Excellence in Education, 1983), these decisions must be made and implemented in a cohesive, timely, and informative manner.

Understanding the market (all audiences, especially those other than the traditional secondary high school market) is of major importance to agricultural education providers. It is of equal importance to understand the way that a given market assimilates information on which it bases its decisions and/or choices. A philosophical direction preceding change is predicated by understanding not only the change itself, but the nature of the forces making the change necessary in the first place.

Consensus by many leading agricultural professionals, and verified in various recent studies, indicates that an increasing proportion of the population is unable to answer questions posed about basic agricultural concepts - i.e., they are not agriculturally literate (ECOP, 1987; Elliot & Dado, 1992; Horn & Vining-Koch, 1986; NAS, 1988; Perry, 1989; Russell, et al. 1990; Zurbrick, 1990 & Zurbrick, 1991). This study measured and assessed two components that are integral to one's agricultural literacy - knowledge base and opinions. Underlying forces that contribute to the formation of one's knowledge base and opinions, and that were foundational to this study are presented in the conceptual framework that follows.

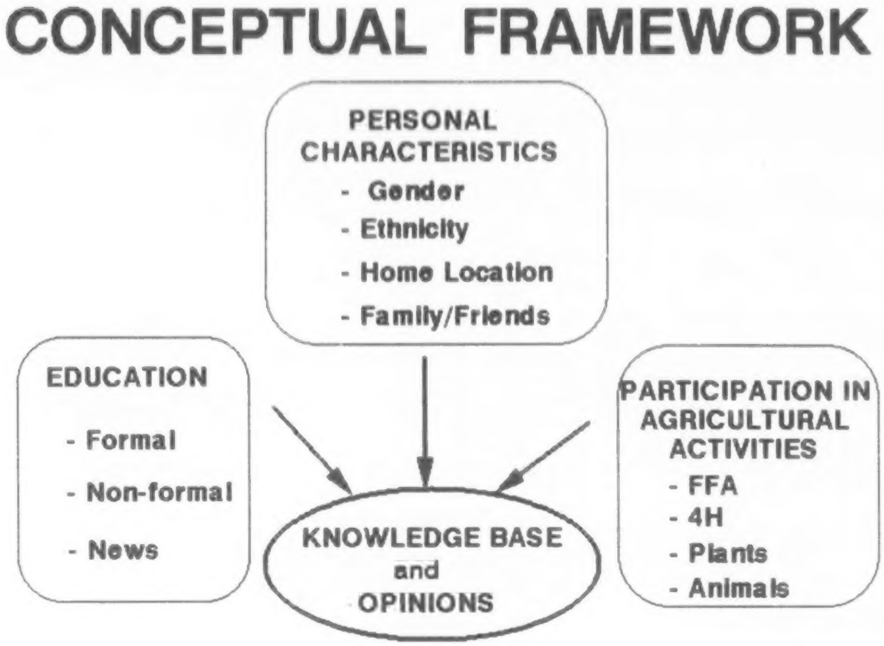
CONCEPTUAL FRAMEWORK
PERSONAL CHARACTERISTICS
- Gender
- Ethnicity
- Home Location
- Family/Friends
EDUCATION
- Formal
- Non-formal
- News
PARTICIPATION IN AGRICULTURAL ACTIVITIES
- FFA
- 4H
- Plants
- Animals
KNOWLEDGE BASE and OPINIONS

Figure 1. Conceptual Framework

Purpose and Research Questions

The purpose of this study was twofold. First, to collect and assess data related to current knowledge base levels about agriculture possessed by urban community college students in Arizona. Second, to solicit and report current opinions about agriculture held by the same sample of individuals.

The research questions developed to address the above stated purposes were as follows:

1. What was the agricultural knowledge base held by urban community college students in the State of Arizona?
2. What level of agreement (opinions) toward agricultural issues was held by urban community college students in the State of Arizona?
3. What relationships, if any, existed among the respondents' knowledge base, opinions and demographics?

Methods

The research employed a descriptive survey design, using a mail survey technique, and may be described as a descriptive and relational study. An 80 statement instrument was modified from an existing instrument (Birkenholz, et al., 1993).

A modified true/false format for the collection of knowledge base data was developed. Table 1 illustrates the data coding process. The modified true/false format asked respondents to answer whether or not the first 40 statements were true or false, and additionally to indicate whether or not they were sure or not sure of their initial response. This technique allowed for the construction of a knowledge base continuum model (see Figure 2), and statistical analysis of the true/false data at the ordinal level.

A 4-point Likert scale was used for the collection of opinion data in statements 41-80. Validity was established by experts in the field. The instrument was pilot tested, and reliability was determined using the Cronbach's alpha method. Reliability coefficients were calculated at 0.69 for the knowledge base portion of the study, and 0.73 for the opinion portion of the study.

Table 1

Knowledge Coding Process

Participant Response	Descriptive Code	Coding Value
True or False and Sure Respondent is Correct	Sure Correct - SC	5
True or False and Not Sure Respondent is Correct	Not Sure Correct - NSC	4
Not Sure Respondent selected Unsure and chose to not select True or False.	Not Sure - NS	3
True or False and Not Sure Respondent is Incorrect	Not Sure Incorrect - NSI	2
True or False and Sure Respondent is Incorrect	Sure Incorrect - SI	1

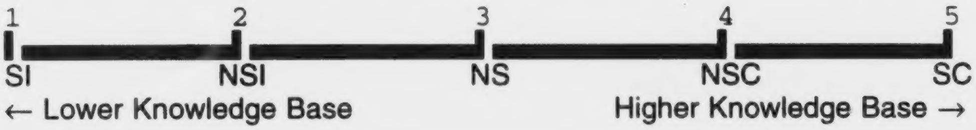

Figure 2. Knowledge base continuum model.

The target population for this study were urban community college students in Arizona. Due to time constraints and resource availability it was determined to limit the population to community college districts in the two largest urban populations in the State of Arizona - Maricopa County (Phoenix) and Pima County (Tucson). Approximately 80% of all Arizona community college students were enrolled in these two districts. About two-thirds of the student populations in the two community college districts were between the ages of 20 and 39. This places the majority of the student population in attendance in parity with the peak of the "baby boom" generation in the general population, and was a reflection of the largest segment of the voting population in this country.

The accessible population was determined to be students enrolled in freshmen composition classes taught by full-time faculty in the Maricopa and Pima Community College Districts during the Spring 1993 semester. Rationale for this selection was based on the freshmen composition requirement throughout program curriculums. This selection enhanced representative sampling across all sectors of the community college population, and reduced sampling error that may occur through sampling specific academic program areas.

The sampling units (freshman composition classes) were determined by compiling a list of all full-time faculty members (99 instructors) teaching freshman composition in both districts. A random selection of 25 faculty names was then drawn, and selected faculty were contacted by telephone, and subsequently sent a cover letter and enough instruments to distribute to one of their classes. A combination follow-up, thank you letter was sent approximately one month after the initial mailing.

The sample consisted of 313 students, and the response rate was calculated at 73% (230 respondents). A comparison of the sample to the target population on known characteristics (age, ethnicity and gender) showed no differences. However, one should use caution when generalizing the results beyond the respondents due to a variety of possible selection bias concerns.

Data were analyzed with SPSS/PC+, and employed frequencies, means, standard deviations, oneway ANOVA, and t-tests as statistical measures. An alpha level of 0.05 was determined a prior.

Results and Conclusions

The following results were determined through the study and should be viewed as generalizable only to the 230 respondents:

Research Question 1

1. Grouped knowledge base analysis revealed that over 30% of the accepting sample responded incorrectly to knowledge inquiries, and that almost 13% were sure of their incorrect responses. Less than a third (30.3%) of the respondents were sure and correct (see Table 2).
2. A comparative group knowledge base analysis showed that a majority (55%) of the respondents were not sure of their responses to inquiries about basic agricultural concepts.
3. The function of the Cooperative Extension Service was not understood by the respondents - over 70% were not sure of their responses.

Table 2

Grouped Analysis of Knowledge Base Assessment

Value	Label	Percent Response
1	incorrect, sure	12.9
2	incorrect, not sure	19.7
3	not sure	6.7
4	correct, not sure	29.1
5	correct, sure	30.3
.	missing	1.3
	TOTAL	100.0

mean = 3.45 sd = .662 n = 230

Research Question 2

4. The grouped analysis for opinion assessment produced a mean of 2.56 on 4-point scale, placing the mean between agree (3) and disagree (2). A majority (54%) of the respondents felt favorable toward the opinion statements (see Table 3).

5. Over 80% of the respondents agreed that they need facts about agriculture in order to make informed decisions.

Table 3

Grouped Analysis of Opinion Assessment

Value	Label		Percent Response
1	strongly disagree		11.8
2	disagree		31.8
3	agree		41.8
4	strongly agree		12.5
.	missing		2.1
		TOTAL	100.0

mean = 2.56 sd = .419 n = 230

Research Question 3

6. Caucasians comprised 64.8% of the respondents. They scored significantly higher than non-whites on both the knowledge and opinion sections of the instrument.

7. Individuals who raised plants responded to inquiries in the knowledge base portion of the study significantly higher than those with no such experience.

8. There were no significant differences on knowledge and opinion scores between those individuals with previous agricultural education experience and those individuals who reported no previous experience.

9. There were no significant differences on knowledge and opinion scores with the following variables: gender, home location, relatives or friends in farming or agricultural business, FFA membership, 4-H membership and experience raising animals.

Educational and Practical Importance of the Study

1. Effective educational programs at all levels need to be developed that incorporate agricultural concepts and expand agricultural awareness.
2. The Cooperative Extension Service should re-evaluate its focus to address agricultural awareness and non-formal educational programs in the rapidly growing urban population.
3. Further research is needed to investigate why there were differences between white and non-white respondents.
4. Current formal agricultural education programs, both vocational and non-vocational efforts, should be re-evaluated to incorporate content and delivery methods that will enhance the ability of those enrolled to better understand and increase awareness about agriculture.
5. Further research is needed to assess the value of participation in 4-H, FFA, and other agriculturally related experiences as it relates to overall agricultural literacy.
6. The results of this study indicate that perhaps the current method of assessing agricultural literacy may need to be re-evaluated. In fact, these results lend support to a future study that would establish an agricultural literacy model.

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AGRICULTURAL AWARENESS IN ARIZONA

A CRITIQUE - BY JAMES P. KEY, OKLAHOMA STATE UNIVERSITY

This study primarily added to the knowledge base of agricultural literacy an additional group in an additional location. However, it did add a unique knowledge coding process. The "Sure, Not Sure" scaling of the true-false answers gave an interesting numerical continuum from a lower knowledge base to a higher knowledge base. It actually added a correction factor for the guessing phenomenon. After developing a sound theoretical framework, including a diagrammed conceptual framework, a twofold purpose and three research questions were developed to clearly guide the conduct of the study. The methods appeared adequate to answer the research questions. Developing the knowledge base continuum in order to be able to analyze the data as ordinal was interesting. An existing instrument was modified for this study and was validated by experts and refined through a pilot test. The internal consistency was documented through Cronbach's alpha. The target population was identified as urban community college students in Arizona, but the sample was taken from freshmen students in community colleges in the two largest urban centers in Arizona. As was stated by the authors, caution should be used in trying to generalize beyond the sample, due to a variety of possible selection bias concerns.

The results were well organized and presented according to the research questions. Specific data were presented in tables for grouped knowledge and grouped opinion analysis to answer Research Questions 1 and 2. No data were shown to support findings for Research Question 3. Statistical comparisons likewise were not shown. A fairly complete current list of references was included. This list would provide a good basis for a future study of this nature.

Of particular note were three findings for Research Question 3. First was the finding that Caucasians scored significantly higher than non-whites on both the knowledge and opinion sections of the instrument. Second, there were no significant differences on knowledge and opinion scores between individuals with previous agricultural education experience and individuals who reported no previous experience. Third, there were no significant differences on knowledge and opinion scores between those with relations or experiences in agriculture and those with none. As has been stated, no supporting data for these results were given. However, these results raise interesting questions. In the case of the first finding, could the instrument be ethnically biased? Or, could there be some reason, other than random chance, that this difference occurred? In the cases of the second and third findings, why would students with previous agricultural education experience or with relatives or friends in farming or agricultural business, FFA membership, 4-H membership and experience raising animals not have significantly greater knowledge and opinion scores? Are these experiences not creating agricultural literacy? Is the instrument not measuring agricultural literacy? Is the scaling technique confusing the analysis? Maybe this is why the authors recommended the current method of assessing agricultural literacy be re-evaluated. Questions are raised here which need to be researched.

REALISTIC EXPECTATIONS OF BEGINNING SECONDARY AGRICULTURE EDUCATION TEACHERS AS PERCEIVED BY BEGINNING SECONDARY AGRICULTURE TEACHERS AND THEIR PRINCIPALS IN THE WESTERN UNITED STATES

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REALISTIC EXPECTATIONS
OF BEGINNING SECONDARY AGRICULTURE EDUCATION TEACHERS AS PERCEIVED BY BEGINNING SECONDARY AGRICULTURE TEACHERS AND THEIR PRINCIPALS IN THE WESTERN UNITED STATES

Theoretical Framework

Educational leaders at most levels confirm that the beginning year of teaching is critical to future success as a professional educator. The many pressures and the feeling of being unable to cope have often led beginning teachers to an early exodus from the profession. Nesbitt (1991) noted that agriculture teachers are not only held responsible for the activities of a regular subject teacher such as classroom management and subject content, but they are also held responsible for the many activities associated with a total program of vocational education in agriculture.

Research indicates that teachers progress through stages of development. Fuller and Brown (1975) gave support to three stages of teacher development which were specific to the following concerns: l) survival concerns, 2) teaching situation concerns, and 3) pupil concerns. The survival stage deals with concerns about one's adequacy as a teacher, about being liked by students, about class control, about being accepted by peers and supervisors, essentially those issues dealing with surviving the first year of teaching.

The educational community has traditionally expected beginners to immediately perform like a veteran. Camp and Heath (1988) suggested that beginning teachers were not prepared for the mass responsibility and expectations of a teacher in vocational subject areas. They recommended: "both teacher education programs and local school systems need to provide realistic expectations for beginning teachers. School systems need to analyze these expectations and determine what is realistic for persons who are relatively inexperienced in their fields" (p. 62).

According to Howey and Zimpher (1989) it should be the first responsibility of higher education to identify the major issues and expectations of beginning teachers and attempt to prepare beginning teachers to effectively deal with the issues and expectations of the first year. Unrealistic expectations of new teachers, in any discipline including agriculture, will continue to exacerbate the problem of the early exit of teachers from the profession.

Purpose and Objectives

The purpose of the study was to identify essential competencies which may be considered realistic expectations of beginning agriculture teachers in order to successfully survive the first year of teaching. The following research questions were developed to guide the study:

1. What competencies did beginning agriculture teachers believe to be critical to successfully survive the first year of teaching?
2. What competencies did principals of beginning agriculture teachers believe to be critical to successfully survive the first year of teaching?
3. To what degree did beginning agriculture teachers and their principals agree upon competencies critical to successfully survive the first year of teaching?
4. What were the areas of greatest need as identified by beginning agriculture teachers in order to successfully survive the first year of teaching?

Methodology

The population for the census study consisted of two groups. Group one included all identified beginning teachers of secondary agriculture in 12 states of the Western United States for a total number of 54. Group two included principals of the identified beginning agriculture teachers for a total number of 52. The reason for the difference in the number of beginning teachers and principals is two of the principals had more than one beginning teacher.

A researcher-developed questionnaire was used to gather data. The survey asked subjects to respond to 70 specific competencies grouped into 12 broad competency areas: maintaining classroom control; dealing with individual student uniqueness and difference; instruction; teacher socialization; administration and management; community outreach; professional development and leadership; program planning and development; summer program; vocational student organization (FFA); supervised agricultural experience (SAE); and facility management, safety, and health. The competency areas were identified from a review of literature regarding first year teacher problems and issues (Mundt 1989). For each competency/task, participants were asked to respond on a Likert-type scale with the following response values: '1' = not critical, '2' = slightly critical, '3' = somewhat critical, and '4' = very critical to the successful survival of a first year experience. Open-ended questions were used to gather information from respondents as to the areas of greatest need during the first year as perceived by beginning teachers. Content validity was established through the use of an expert panel of educators. Each were given the broad educational areas and asked to place the appropriate list of competencies under appropriate areas. Based upon responses, minor modifications were made. The questionnaire was then pilot tested by beginning teachers and principals. A total of six pilot subjects were used; three from each sample group. Once again, minor modifications were made based upon pilot results. Dillman's procedures were followed and two complete mailings plus follow-up telephone reminders were conducted. Questionnaires were mailed in April of 1992 to teachers and principals. The hope was to gain their input at the conclusion of their first year.

Useable survey instruments were returned by 36 of 54 beginning agriculture teachers and 36 of 52 principals for a combined return of 68%.

The findings of the study were reported utilizing descriptive statistical measures for mean, frequency, and percent of response. Standardized scale scores were computed on each broad competency area and reliabilities ranged from .68 to .97. The Statistical Package for Social Sciences (SPSS 4.1) was used to analyze the data. Judgements were made based on frequency and similarity of response for the open-ended qualitative data.

Findings

Beginning teachers and their principals were asked to respond on a Likert-type scale to 70 specific competencies in 12 broad competency areas which may have been critical to successfully surviving the first year teaching experience. Each of the 12 broad areas contained a list of three to ten specific competencies which further defined the broad category. Mean scores were computed on each broad competency area.

Maintaining classroom control (Table 1) was identified by beginning agriculture teachers (mean = 3.764) and their principals (mean = 3.889) as the most critical competency for first-year agriculture teachers. Both groups (teacher mean = 3.743; principal mean = 3.826) agreed that facility management, health, and safety was the second most critical competency. Principals identified instruction (mean = 3.508) third and FFA (mean =

3.236) as the fourth most critical competency while teachers identified the FFA (mean = 3.618) third and instruction (mean = 3.514) as the fourth most critical competency.

Table 1

Rank by Mean Score of the 12 Competency Categories by Beginning Agriculture Teachers and Their Principals.

Competency Area	Teachers' Mean Score*	Competency Area	Principals' Mean Score*
Maintaining classroom control	3.764	Maintaining classroom control	3.889
Facility management, health, and safety	3.743	Facility management, health, and safety	3.826
Vocational student organization (FFA)	3.618	Instruction	3.508
Instruction	3.514	Vocational student organization (FFA)	3.236
Program which extends into the summer	3.457	Individual student uniqueness & difference	3.222
Program planning & development	3.396	Program planning & development	3.207
Administration & management	3.319	Supervised agricultural experience programs (SAEP)	3.182
Supervised agricultural experience programs (SAEP)	3.315	Administration & management	3.061
Community outreach	3.194	Community outreach	3.000
Individual student uniqueness and difference	3.076	Teacher socialization	2.917
Professional development & leadership	2.872	Professional development & leadership	2.644
Teacher socialization	2.771	Program which extends into the summer	2.571

* Not Critical = 1, Slightly critical = 2, Somewhat critical = 3, and Very Critical = 4

The data in tables two through five exhibits the responses by beginning agriculture teachers and their principals to the identified specific competencies included within each of the four highest ranked broad competency areas. The four highest ranked broad competency areas were: maintaining classroom control; facility management, safety, and health; instruction; and vocational student organizations (FFA).

In the broad competency area of maintaining classroom control (Table 2), both teachers and principals rated three specific competencies which were: defining student behavior expectations, administering discipline effectively, and maintaining a positive learning environment to be very critical to successfully surviving the first year of teaching. The frequency of response for the three specific competencies ranged from a low of 83% to a high of 97%. It is noted that 53% of the teacher respondents indicated that working within the school policy regarding student discipline to be very critical to successfully surviving the first year of teaching.

Table 2
Responses to the Identified Competencies of Maintaining Classroom Control.

	Frequency Percent							
	Not Critical		Slightly Critical		Somewhat Critical		Very Critical	
Identified Competencies	T**	P***	T	P	T	P	T	P
a) work within school policy regarding student discipline	0 0	0 0	4 11.1	0 0	12 33.3	6 16.7	19 52.8	30 83.3
b) define student behavior expectations	0 0	0 0	1 2.8	0 0	3 8.3	1 2.8	31 86.1	35 97.2
c) administer discipline effectively	0 0	0 0	0 0	0 0	5 13.9	5 13.9	30 83.3	31 86.1
d) maintain positive learning environment	0 0	0 0	0 0	0 0	3 8.3	0 0	32 88.9	35 97.2

* Teachers (n=36) ** Principals (n=36)

In the broad competency area six of facility management, safety, and health (Table 3), both teachers and principals rated three specific competencies which were: ensuring all students receive appropriate safety instruction, ensuring all tools and equipment are working properly and safely, and ensuring that safety records are filed in compliance with local and state standards as very critical to successfully surviving the first year of teaching. The frequency of response for the three specific competencies ranged from a low of 75% to a high of 97%.

Table 3
Responses to the Identified Competencies of Facility Management, Safety and Health.

	Frequency Percent							
Identified Competencies	Not Critical		Slightly Critical		Somewhat Critical		Very Critical	
	T**	P***	T	P	T	P	T	P
a) maintain classroom, office, and laboratory neat and orderly	0 0	0 0	3 8.3	2 5.6	10 27.8	13 36.1	23 63.9	21 58.3
b) ensure all students receive appropriate safety instruction	0 0	0 0	1 2.8	0 0	0 0	4 11.1	31 86.1	35 97.2
c) ensure all tools and equipment are working properly and safely	0 0	0 0	1 2.8	0 0	3 8.3	3 8.3	32 88.9	33 91.7
d) ensure safety records are filed in compliance with local and state standards	0 0	0 0	1 2.8	1 2.8	8 22.2	2 5.6	27 75.0	33 91.7

* Teachers (n=36) ** Principals (n=36)

In the broad competency area of instruction (Table 4), both teachers and principals rated two specific competencies which were: motivating students and developing positive rapport with students as very critical to successfully surviving the first year of teaching. The frequency of response for the two specific competencies ranged from a low of 78% to a high of 83%.

Table 4
Responses to the Identified Competencies of Instruction.

	Frequency Percent							
	Not Critical		Slightly Critical		Somewhat Critical		Very Critical	
Identified Competencies	T**	P***	T	P	T	P	T	P
a) identify teaching resources	0 0	0 0	3 8.3	3 8.3	7 19.4	23 63.9	25 69.4	10 27.8
b) develop student centered learning activities	0 0	0 0	0 0	3 8.3	10 27.8	17 47.2	25 69.4	16 44.4
c) use a variety of teaching methods	0 0	0 0	3 8.3	1 2.8	16 44.4	10 27.8	16 44.4	25 69.4
d) monitor and evaluate student progress	0 0	0 0	2 5.6	0 0	18 50.0	15 41.7	15 41.7	21 58.3
e) use state curriculum outlines and guides	1 2.8	0 0	9 25.0	6 16.7	18 50.0	20 55.6	7 19.4	10 27.8
f) motivate students	0 0	0 0	0 0	0 0	7 19.4	7 19.4	28 77.8	29 80.6
g) develop positive rapport with students	0 0	0 0	0 0	0 0	6 16.7	6 16.7	29 80.6	30 83.3

* Teachers (n=36) ** Principals (n=36)

In the broad competency area of FFA (Table 5), the sub-competencies were overall rated higher by the teachers as compared to the principals.

Table 5
Responses to the Identified Competencies of Vocational Student Organization (FFA).

	Frequency Percent							
Identified Competencies	Not Critical		Slightly Critical		Somewhat Critical		Very Critical	
	T**	P***	T	P	T	P	T	P
a) develop chapter program of activities	0 0	1 2.8	0 0	18 50.0	12 33.3	16 44.4	24 66.7	1 2.8
b) encourage 100% membership in local, state, and national organizations	1 2.8	0 0	6 16.7	9 25.0	11 30.6	15 41.7	18 50.0	11 30.6
c) maintain membership rosters	2 5.6	0 0	2 5.6	11 30.6	9 25.0	14 38.9	23 63.9	10 27.8
d) elect local chapter officer	0 0	0 0	0 0	2 5.6	5 13.9	13 36.1	31 86.1	20 55.6
e) initiate chapter fund raising	0 0	0 0	2 5.6	3 8.3	8 22.2	19 52.8	26 72.2	12 33.3
f) initiate school and community public relations	0 0	0 0	2 5.6	3 8.3	9 25.0	18 50.0	25 69.4	14 38.9
g) participate in local, district, or regional leadership development activities and competition	0 0	0 0	2 5.6	3 8.3	9 25.0	20 55.6	25 69.4	12 33.3
h) participation in state leadership conference and competition	0 0	0 0	2 5.6	2 5.6	6 16.7	21 58.3	28 77.8	11 30.6

* Teachers (n=36) ** Principals (n=36)

Beginning teachers were asked in an open-ended question to list up to three areas of greatest need during their first year of teaching. The identified areas of greatest need were: 1) time management and organization, 2) guidance and support from supervisors and other teachers, 3) orientation to school policies and reports, 4) discipline and classroom control, and 5) teaching resources and reference materials.

Conclusions

1. Beginning agriculture teachers and their principals agreed that maintaining classroom control as the most essential competency needed by beginning teachers to successfully survive the first year of teaching. They also agreed that facility management, safety, and health was the second most critical competency needed by both beginning teachers and their principals. Instruction and the FFA were also considered by beginning agriculture teachers and their principals as essential competencies needed to survive the first year of teaching. However, the teachers' responses indicated that FFA was perceived to be more important than instruction and the principals' responses indicated that instruction was perceived to be more important than the student organization FFA.
2. Maintaining classroom control contained three sub-competencies which were highly rated by beginning agriculture teachers and their principals as essential to successfully surviving the first year of teaching. The identified sub-competencies were: 1) maintaining a positive learning environment, 2) defining student behavior expectations, and 3) administering discipline effectively.
3. Beginning agriculture teachers and their principals highly rated three sub-competencies within the competency category of facility management, safety, and health. The sub-

competencies were: 1) ensure all students receive appropriate safety instruction, 2) ensure all tools and equipment are working properly and safely and, 3) ensure safety records are filed in compliance with local and state standards.

4. In the competency category of instruction, the two most highly rated sub-competencies were: 1) develop positive rapport with students and 2) motivate students.
5. Beginning teachers identified time management and organization as their area of greatest need during their first year of teaching.

Recommendations

The nature of the agriculture teaching position is by accepted definition very broad and diverse. The position requires a broad range of competencies. As a new teacher enters the profession those involved with the training and supervision of teachers must be reasonable in their expectation of the first year agriculture teacher. The beginning teacher of agriculture cannot be expected to immediately perform as a veteran. Some important areas of a total program in agricultural education most probably should wait. However, those areas essential to the successful survival of a first-year teacher must be emphasized.

To effectively address the issue of beginning teacher needs, key professionals such as teacher educators, state supervisors, principals, and the beginning teachers must agree on what is most important for a novice teacher to survive. Communication is needed between these various constituencies to share stories, information, and ideas on what is necessary and less necessary for a first year of teaching. When this type of dialogue occurs, practices of inducting a new teacher can be shaped and implemented. When this occurs, beginning teachers will benefit.

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REALISTIC EXPECTATIONS OF BEGINNING SECONDARY AGRICULTURE EDUCATION TEACHERS AS PERCEIVED BY BEGINNING SECONDARY AGRICULTURE TEACHERS AND THEIR PRINCIPALS IN THE WESTERN UNITED STATES

A CRITIQUE - BY JAMES P. KEY, OKLAHOMA STATE UNIVERSITY

This study researches a topic of extreme importance to agricultural education in particular and to teacher education in general. The theoretical framework pointed out this fact, and although short and to the point, adequately developed the theory basis for the study. The purpose and research questions were clearly developed to guide the conduct of the study. The methods used were adequate to answer the research questions, based on a survey of the census of new teachers and their principals. The questionnaire was soundly developed using competencies based on a thorough review of literature of first year teacher problems and issues. It was further validated by a panel of experts and refined through pilot testing. Dillman's survey procedures were followed, including two mailings and telephone reminders. The 68% return is admirable for a mailed questionnaire.

Overall, the findings and conclusions indicated the beginning teachers and their principals rated the identified competency categories and most of the individual competencies "very critical" and "somewhat critical." Although not stated explicitly in the paper, there was close agreement between the beginning teachers and their principals on the competency categories and individual competencies critical to successfully survive the first year of teaching. Of the top four categories, teachers rated the FFA one slot higher than principals and principals rated Instruction higher than teachers. In the remainder, teachers rated Summer Programs much higher than the principals and the principals rated Individual Differences quite a bit higher than teachers. Of the individual competencies reported, both groups rated them quite similarly except for the FFA competencies. The teachers rated them quite a bit higher than the principals. The areas of greatest need identified by the beginning teachers were quite revealing as evidenced by Time Management and Supervisory Guidance being on the top of their list.

This summary of the findings and conclusions leads to some critique questions. Findings were reported for research questions #1,#2, and #4. What were the findings for #3? Conclusions #1 and #5 indicate some of the meanings of the findings. The other conclusions seem to be repeats of findings. What did those findings mean? The first recommendation said the essential areas of the total program must be emphasized by the first-year teacher and other areas most probably should wait. Which areas did this study recommend to those teacher educators, state supervisors, principals and beginning teachers as essential areas to be emphasized or those which were less important that could wait?

ASSESSMENT OF COGNITIVE LEVEL OF INSTRUCTION, ASPIRATION AND ATTITUDE TOWARD HIGHER LEVEL INSTRUCTION

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Introduction

The American higher education system has fallen under intense scrutiny in the past decade. This intense national concern was sparked by several major national reports sharing a view that undergraduate education in general had become incoherent and ineffective (Reagan et al., 1987). The theme of the system's ineffectiveness--failure to encourage students to think.

"Traditionally, instruction in how to think has been a neglected component in American education" (Halpern, 1984. p. ix). McKeachie contends that, "Everyone agrees that students **learn** in college, but whether they learn to **think** is more controversial" (Joscelyn, 1988). Paul (1993) wrote, "...up to 90% of what is done in classrooms today discourages critical thinking" In response to these and other accusations, undergraduate curricula is experiencing revision.

The goal of the nationwide undergraduate curriculum revision is to expand and enrich the intellectual experience of every undergraduate. To accomplish that goal, educators are encouraged to design courses and programs that produce "educated persons", defined by Reagan et al. (1987) as the ability to write and speak, read and listen, and the ability to engage in careful logical thinking and critical analysis.

Educating for "Educated Persons"

It has been recommended that future "educated persons" in colleges of agriculture complete a total undergraduate curriculum specifically emphasizing science and technology, and analysis and problem solving. However, simply adding science and technology, and analysis and problem solving courses to the curriculum will not develop the primary characteristics of an "educated person". The way in which the curriculum **is taught** will make the difference (Whittington, 1991).

"How the instructor handles the subject matter is more important than the subject matter itself" (Axelrod, 1973). Axelrod (1973) proposed an instructor-centered teaching style wherein students learn "conceiving, defining, and reasoning about problems and issues by emulating the instructor". Paul, nearly twenty years later, also wrote of the importance of the instructor. "The best way to stimulate the thinking of students is to have a thinking person in front of them who is asking questions and is responding individually to each of the students in accordance to the responses of each of the students..." (Paul, 1990).

The power to think and solve problems should be the student outcome desired by professors. Achieving that desired outcome may depend, ultimately, on the ability of professors to demonstrate and model thinking and problem solving and cognitive skills for students during class sessions.

A Theory for Cognition Research

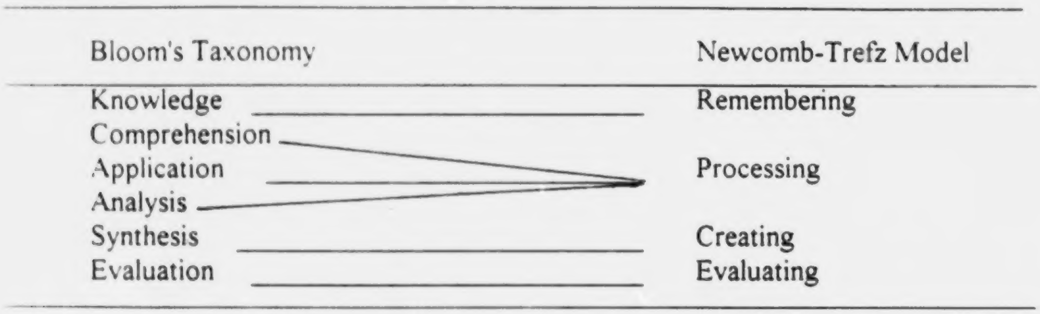
The Taxonomy of Educational Objectives: Cognitive Domain, developed by Bloom et al (1956), was built on a theory of varying levels of cognitive complexity. In the Taxonomy, Bloom argues that accomplishing higher order thinking (application, analysis, synthesis and evaluation) requires some analysis or understanding of the new situation; it requires a background of knowledge of methods which can be readily utilized; and it also requires some facility in discerning the appropriate relations between previous experience and the new situation.

Therefore, using Bloom's Taxonomy as a framework for classifying levels of thinking provides focus and direction for teachers interested in improving the quality of learning in their classrooms (Newcomb and Trefz, 1987; Cano, 1988).

Bloom's Taxonomy was condensed by Newcomb & Trefz (1987) from six levels into four levels (see Figure 1). The Newcomb-Trefz model and Bloom's Taxonomy were used in this study.

Figure 1

Comparison of Bloom's Taxonomy and The Newcomb-Trefz Model


Bloom's Taxonomy
Newcomb-Trefz Model
Knowledge
Remembering
Comprehension
Application
Analysis
Processing
Synthesis
Creating
Evaluation
Evaluating

Objectives and Purpose of Study

The purpose of this descriptive-correlational study was to describe the aspired cognitive level of instruction and the assessed cognitive level of instruction and determine the relationship of these variables to attitude toward teaching at higher cognitive levels among selected faculty members in the College of Agriculture at the University of Idaho. The study was an in-depth examination and compilation of fourteen case studies. Specific research questions were:

1. At what level of cognition do participants aspire to teach?
2. At what level of cognition are participants actually teaching?
3. Among participants, what is their attitude toward teaching at higher cognitive levels?
4. What are the relationships between aspired cognitive level of instruction, actual cognitive level of instruction, attitude toward teaching at higher cognitive levels and demographic information?

Procedures

Population and Sample

The target population for this study was 187 faculty members in the College of Agriculture at the University of Idaho. The accessible population was faculty members on campus in Moscow, who had a teaching appointment on the general funds budget and who were teaching at least one undergraduate course during Fall Semester, 1993 (August 23, 1993 -

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December 17, 1993) Fourteen faculty members from each of eight departments/schools in the College of Agriculture were purposefully selected. The selection process included nomination by department chairs who based their selections on criterion for good teaching. After nomination, faculty members were asked by the researcher for their participation.

Instrumentation

Three of the instruments used in this study, a demographic instrument, an aspired cognitive level of instruction instrument and an attitude toward teaching at higher cognitive levels instrument, were developed by the researcher and validated by a panel of experts during an earlier research study. Reliability was established using data from the pilot study of 25 college of agriculture faculty members, not included in the original research (68% return rate, r = .86). Reliability was also established with the current sample. The 50-item, six point Likert-type attitude instrument was shown to have a reliability coefficient of .88 using Cronbach's Alpha.

Additionally, the cognitive level of classroom discourse was described by analyzing in-class discourse using the Florida Taxonomy of Cognitive Behavior (FTCB) (Webb, 1970). This instrument is based upon Bloom's Taxonomy and is designed to identify specific cognitive behaviors. Validity for this instrument was based upon its direct development from Bloom's Taxonomy and the support generally given to this hierarchy of cognitive behaviors. Reliability for this instrument was established by coding audio-tapes of lectures and establishing Spearman Rho reliability coefficients. Intra-rater reliability was approximately p = .96. Inter-rater reliability between previous researchers was approximately p = .98.

Participants were observed and audio-taped during class sessions six times during the Fall Semester; approximately every two weeks. The observations were split evenly between two raters.

Collection

Aspired cognitive level of instruction, attitude toward teaching at higher cognitive levels and demographics were measured during a participant workshop held the first week of Fall

Semester, 1993. To determine aspired cognitive level of instruction, participants placed 10 chips, in proportion to their aspired cognitive level of instruction, on each of four quadrants on a posterboard marked remembering, processing, creating, and evaluating. The proportion of chips placed on each quadrant was recorded as a portion of one hundred, thus revealing the aspired level, in percentages, at each level of cognition. A test/retest procedure was adopted to establish the reliability of this methodology during the original research. The test/retest coefficient indicated the methodology was reliable.

Data Analysis

The Statistical Package for the Social Sciences (SPSSx/PC+) computer package was used to analyze the data. For each variable in the study, measures of central tendency and frequency distributions were generated and then used to describe the sample in the study. Pearson Product Moment Coefficients of the Correlation were calculated between aspired and assessed cognitive level of instruction, attitude toward teaching at higher cognitive levels, and demographic information.

Results

Aspired Cognitive Level of Instruction

Participants **aspired** to have approximately one-half of their discourse at the remembering and processing levels (see means in Table 1). Aspirations for discourse at the creating level ranged from 0 to 40% while aspiration at the evaluating level ranged from 10 to 60%.

Assessed Cognitive Level of Instruction

As can be seen in Table 1, the discourse of participants in this study was **assessed** to be approximately 98% at the remembering and processing levels. Participants' discourse was approximately 1% at the creating level with a range of 0 to 6%. Evaluating level discourse was assessed at less than 1%

Table 1

Aspired and Assessed Cognitive Level of Discourse

	Aspired percent			Assessed percent	
Level of cognition	Mode	Mean	Range	Mean	Range
Remembering	20	26	10-50	48	25-60
Processing	30	27	20-40	50	39-68
Creating	20	19	0-40	1	0-6
Evaluating	20	28	10-60	<1	<1-1

Discrepancy Between Aspired Levels and Assessed Levels

Regardless of the aspired level of discourse at the remembering level, between 25%-60% of the participants' discourse occurred at the remembering level. All participants achieved a higher percentage of discourse at the processing level than the proportion to which they aspired. No one was assessed as having greater than 6% of their discourse at the creating level, no matter the aspiration. Participants failed to reach their aspiration for discourse at the evaluating level by as much as 60%.

Relationship Between Aspiration and Assessment

Correlation coefficients between aspired cognitive level of instruction and assessed cognitive level of instruction revealed that those who aspired more instruction at the remembering level taught less at the higher cognitive levels (see Table 2). Those who aspired for more instruction at the processing level were teaching more at the evaluating level and less at the remembering level. Those who aspired for more instruction at the evaluating level were not reaching that level. However, very little association was found between aspired cognitive level of instruction and in-class discourse. Also, no correlations were significant at the .05 level.

Table 2

Relationship Between Aspired and Assessed Cognitive Level of Instruction

Cognitive level of instruction		
Aspired	Assessed	Association
Remembering	Remembering	r = .14
	Processing	r = -.10
	Creating	r = -.23
	Evaluating	r = -.28
Processing	Remembering	r = -.28
	Processing	r = .26
	Creating	r = .28
	Evaluating	r = .47
Creating	Remembering	r = -.20
	Processing	r = .18
	Creating	r = .19
	Evaluating	r = .37
Evaluating	Remembering	r = .18
	Processing	r = -.19
	Creating	r = -.10
	Evaluating	r = -.31

Note. No correlations were significant at the .05 level.

Attitude Toward Teaching at Higher Cognitive Levels

Participants completed a 50-item Likert scale instrument designed to measure their attitude toward teaching at higher cognitive levels. The mean score on the attitude instrument (232 on a scale of 50 - 300) indicated that participants in the study had attitudes which favored teaching at higher cognitive levels.

Relationships: Aspiration and Attitude

Table 3 shows, as attitude toward teaching at higher cognitive levels increased, proportion of discourse at the remembering level decreased. As attitude toward teaching at higher cognitive levels increased, extent of discourse at the processing and creating levels also increased. However, no correlations were statistically significant.

Table 3

Relationship Between Aspired Cognitive Level of Instruction and Attitude Toward Teaching at Higher Cognitive Levels

Level of cognition	Association
Remembering	r = -.3996
Processing	r = .1974
Creating	r = .2338
Evaluating	r = .0520

Note. No correlations were significant at the .05 level.

Relationships: Assessment and Attitude

The strongest relationship between assessed cognitive level of instruction and attitude toward teaching at higher cognitive levels was in the area of evaluating. As attitude toward teaching at higher cognitive levels increased, discourse, at the evaluating level increased. No correlations were of statistical significance.

Table 5

Relationship Between Assessed Cognitive Level of Instruction and Attitude Toward Teaching at Higher Cognitive Levels

Level of cognition	Association
Remembering	r = -.1054
Processing	r = .1223
Creating	r = -.0388
Evaluating	r = .3299

Note. No correlations were significant at the .05 level.

Relationships to Characteristics

Attitude toward teaching at higher cognitive levels was positively related to increased number of courses taught per year, number of education courses taken, holding a teaching certificate or credential, and number of teaching workshops and seminars attended. Attitude toward teaching at higher cognitive levels was negatively associated with age. No correlations were statistically significant.

Conclusions

The following conclusions are derived from the researchers' interpretations of the results of this study:

1. Participants in this study primarily aspired for their discourse to be balanced across the levels of cognition. There was aspiration among participants to conduct discourse at the creating and evaluating levels.
2. The faculty members in this study conducted discourse primarily at the remembering and processing levels of cognition.

3. The participants in this study aspired to teach at cognitive levels higher than those at which they were assessed.
4. Regardless of the cognitive level to which faculty members in this study aspired to conduct discourse, they conducted discourse at about the same level. There was little discourse at the creating and evaluating levels.
5. Participants in this study held favorable attitudes toward teaching at higher cognitive levels.
6. Faculty members in this study who possessed more favorable attitudes toward teaching at higher cognitive levels wanted less discourse at the remembering level.
7. Participants who held a more favorable attitude toward teaching at higher cognitive levels taught more at the evaluating level. However, the cognitive level of discourse was not strongly associated with attitude toward teaching at higher cognitive levels.
8. Faculty members who had experienced more educational activities held more favorable attitudes toward teaching at higher cognitive levels.

Educational and Practical Importance of the Study

1. Professors should make changes in their current teaching to reach the cognitive levels to which they aspire for their instruction.
2. Professors need to study their own teaching and the teaching of others. The cognitive level of discourse was generally at the same level regardless of the course level or subject matter; should this be the case?
3. Professors should be encouraged to attend teaching workshops, seminars and to attend teaching methods classes. Educational activities were associated with attitude toward teaching at higher cognitive levels.

Recommendations for Further Research

1. Develop an instrument for assessing classroom discourse that provides the researcher with equal opportunities to record behaviors across all levels of cognition.

2. Additional study is needed to determine the extent to which laboratories, discussion groups, field trips and other activities provided by the professor outside of the classroom situation contribute to higher cognitive levels of instruction.
3. A future study should develop a regression model for establishing contributions of professor variables and student variables to higher cognitive levels.
4. Determine the retention rate of information in relation to the cognitive level at which the information was delivered. An example might be to re-administer final course examinations to students one year after completion of the course and then assess the cognitive level of items retained by the students.

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ASSESSMENT OF COGNITIVE LEVEL INSTRUCTION, ASPIRATION AND ATTITUDE TOWARD HIGHER LEVEL INSTRUCTION

A Critique

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The authors should be commended for addressing a timely topic as college educators nationally are encouraged to expand and enrich the intellectual experience of undergraduate students. Theoretical Framework - This study addressed the relationship between the desired levels of cognitive teaching and the assessed levels of teaching of college instructors. The investigation builds on previous research within agricultural education and provides linkages to related disciplinary based research. The explanation of Bloom's Taxonomy and the Newcome-Trefz model helped clarify the theoretical base. The objectives and purpose of this study were clearly stated.

Methodology - The authors stated that the target population for this study was 187 faculty in the College of Agriculture at the University of Idaho. The accessible population was faculty members on campus in Moscow, who had undergraduate teaching appointments during the Fall Semester 1993. Fourteen faculty from eight departments/schools in the College of Agriculture were purposefully selected (nominated by the chair) for this study. In many universities it is not uncommon for departments to vary greatly in size. In addition, when assessing levels of cognitive teaching ability, what is gained by selecting only the best teachers from each department/school. Since this population was specifically selected, the results cannot be generalized to the population. In order to obtain a generalizable sample of faculty members, I would have preferred a random sample of all members of the accessible population, stratified by department. Aspired cognitive level of instruction data were collected when participants placed 10 chips in proportion to their aspired cognitive level of instruction on each of four quadrants. A test/retest coefficient was said to indicate this methodology was reliable, yet no coefficient was presented. The authors should be commended for the huge task of video taping each instructor six times during the semester. However, a threat to the internal reliability of this study may be the teachers change in teaching styles when the researchers were present. Did teachers know they were being video taped ahead of time or could their teaching behaviors change when a video camera came into their classroom?

Findings - During the Objectives and Purpose section of this study the authors were careful to state they would describe the aspired cognitive levels of instruction and the assessed cognitive levels of instruction and determine the relationship of these variables; however, Table 2 and subsequent text addressed discrepancies between aspired levels and assessed levels using means and ranges. Since aspired and assessed means and ranges were collected using two different instruments/procedures, I am concerned that the authors are comparing apples with oranges. There may be a need to develop an instrument on which both aspired and assessed cognitive levels of instructions could be measured for future comparisons. The faculty in this study were selected through teaching undergraduate classes. Could there be differences in the cognitive levels of instruction between lower and upper division courses? In addition, there may be differences between teaching styles and levels of teaching between departments. I would have preferred seeing this data presented in the results section. I commend the researchers for undertaking this study and encourage them to continue to conduct research relative to the cognitive teaching levels of college faculty. I would be interested to learn if cognitive teaching levels differ between graduate and undergraduate students.

AGRI-SCIENCE EQUAL TO SCIENCE?

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Introduction

For years in the minds of some, secondary Agricultural Education courses have had a reputation of being easy classes, where rural students learn competencies needed for farming, ranching, and other unskilled occupations. It was very common in years past for agricultural students to be viewed as job oriented instead of college bound. However, today's Agricultural Education students have new challenges facing them as they explore careers. Fewer job opportunities exist in production agriculture fields. Agricultural related occupations are where job opportunities are, and most agricultural related occupations require knowledge in mathematics and science. For Agricultural Education classes to be most beneficial the curriculum needs to be more academically focused. Mathematics and science must be taught to high school students for them to be competitive in today's job market.

In the late 1980's the Agricultural Education Division of the Oklahoma State Department of Vocational and Technical Education began introducing new non-production oriented courses. These new courses were designed to meet the needs of students in Agricultural Education classes in urban as well as rural areas. They challenge students more in mathematics and science. One course dealing with those two disciplines, and directed toward hands-on student participation, was Principles of Agricultural Technology (PAT), an agricultural physics course.

Principles of Agri-technology was started as a pilot program in two school districts in the state of Oklahoma in the 1989-90 school year. PAT was piloted into traditional

Agricultural Education classrooms by traditional Agricultural Education instructors (these instructors also had certification in physics on their standard teaching certificates). PAT used the "Principles of Technology" text, a curriculum developed by the Center for Occupational Research and Development (CORD), of Waco, Texas, with the support of a consortium of states. PAT is basically an applied physics curriculum that is directed toward agricultural applications by the Agricultural Education instructor. PAT is still used as part of the curriculum in the Agricultural Education departments in the two school districts in which the pilot program was started, and is being taught in other Agricultural Educational departments in Oklahoma as well.

Theoretical/Literature Base

In an August 31, 1992 memorandum from the Oklahoma State Superintendent of Public Instruction, Sandy Garrett, to Oklahoma School Administrators, Principles of Agri-technology was said to be an alternative course for high school physics. Garrett (1992) said PAT may be placed on a high school transcript as physics if the instructor was certified in the physics content area. For the first time in the history of Agricultural Education in Oklahoma, an Agricultural Education course could be taken for science credit instead of as an elective.

Traditional physics courses have done an excellent job teaching physics principles to the more academically motivated students. Technology courses being taught by both physics and technology instructors have become quite popular as educators stress the importance of a strong physics foundation. However, in spite of these advances, 80 percent of high school students do not complete a physics course (CORD, 1992). As more physics classes are needed, PAT appears to be one way for Agricultural Education students to receive a working knowledge of physics. After three years of implementation of PAT in Oklahoma Agricultural Education programs it is deemed necessary to evaluate the course. We must ask the question, "Can Principles of Agri-technology, an applied physics course taught in a traditional Agricultural Education program, be as beneficial and academically valid toward teaching physics principles to high school students as regular high school physics courses?"

Agriculture is an ever-changing industry. As the National Summit on Agricultural Education concluded, "Change is rampant in agriculture, and agricultural education must keep pace or become an obsolete remnant of the past." (Cook, 1992, P. 11) One change Agricultural Education has espoused has been to try various approaches to teaching agri-science. Agriculture has always been touted as being an applied science. In other words, agriculture teachers taught the principles of science as they applied to agriculture.

For example, when the agriculture education teacher taught about use of electrical power on the farm, Ohm's Law and the principles of physics as they apply to electricity had to be taught in order for students to understand how electrical power could be applied to accomplish agricultural tasks. When teaching agricultural machinery, the agricultural education teacher taught the physics principles of force, vectors, levers, and many others. But how about reversing the role and teaching physics using agricultural examples?

The Center for Occupational Research and Development (CORD) has developed an applied physics curriculum called Principles of Technology, designed for the middle 50% of students who would not normally take a physics course. This curriculum was designed by physics teachers, vocational teachers, physics professionals and industry representatives with the support of a consortium of states. In Oklahoma it has been taught by physics certified science and vocational teachers. The question arose concerning the learning of physics principles by students taught a regular physics curriculum versus those taught the Principles of Technology curriculum.

Purpose

The purpose of this study was to compare student learning of physics principles between classes taught the regular physics curriculum and those taught the Principles of Technology curriculum in a regular Principles of Technology class and in a Principles of Agri-Technology class, as measured by a test constructed by the teachers.

Methods/Procedures

The teachers constructed a 100 item test of the physics principles common to both curriculums and reflective of the Student Learner Outcomes for physics as prescribed by the Department of Education of the State of Oklahoma. This test was administered as a pre-test in all three classes at the beginning of the 1992-93 school year. The respective curriculums were taught throughout the year and the test administered as a post-test at the end of the school year. In order to be included in the study, students had to take the pre-test, remain in their respective class throughout the school year, and take the post-test. There were 24 students who were included in the regular physics class, 10 in the regular Principles of Technology class and 9 in the Principles of Agri-Technology class. Original numbers in the three test classes were larger than the total numbers recorded that finished the courses. Students originally taking the pre-test in the high school Physics courses numbered 28, but only 24 remained in the class during the year. Twenty-two students began Principles of Technology, with some dropout students and some graduating at mid-term among the top reasons, only ten students completed the course. The Principles of Agri-technology started the year with 16 students. Two students changed courses at mid-term, two students moved out of the district, two students dropped out of school leaving ten students to complete the course. One student, however, was out of school the last three weeks due to illness and was not available for the post-test, so the number of students to be considered in the Principles of Agri-technology course was nine. The regular physics class was taught by a physics teacher in the same metropolitan school where the Principles of Agri-Technology class was taught by an agricultural education teacher certified to teach physics. The regular Principles of Technology class was taught in a different metropolitan school by a technology teacher certified to teach physics.

Results and Conclusions

The pre-test scores (Table I) indicated the regular physics students started the class with an average score 5.93 points greater than the regular Principles of Technology students, who in turn, started the class with an average score 3.29 points greater than did the Principles of Agri-Technology students. This difference was expanded slightly in the post-test, as the regular physics students ended the class with an average score 6.13 points greater than the regular Principles of Technology students, who in turn ended the class with an average score 5.40 points greater than the Agri-Technology students. The mean difference between the pre- and post-test scores for the regular physics students was 14.29 points, the regular Principles of Technology students 14.10 points and for the Principles of Agri-Technology students 12.00 points. The t-test comparisons between pre- and post-test scores for all groups were statistically significant, indicating statistically significant learning of physics principles occurred in all groups. None of the t-test comparisons of difference scores between the classes were significant (Table II), indicating statistically equal gains in learning of physics principles for all classes. Therefore, it is concluded that the two curricula were statistically equal in producing learning of physics principles, even with teachers with different primary teaching backgrounds teaching them.

However, it should be noted that these were convenience samples of intact classes, chosen because of their availability and the teachers' willingness to cooperate with the project. It should also be noted that all class sizes were under 30, the recommended minimum sample size for best analysis, and two of the classes were only 10 and 9 respectively. It is recognized that these small numbers severely limit the analysis of these data. With this in mind it is interesting to note that the students in the regular physics class started out with the highest scores and achieved the highest scores at the end, perhaps indicating these students had the strongest background in science going into the study of physics. Likewise, the regular Principles of Technology students had the next highest scores, both on pre- and post-test, perhaps indicating a less strong background in science than the regular physics students, but stronger than the Principles of Agri-Technology students. This indicates the two classes taught the Principles of Technology curriculum did not achieve average scores quite as great as the regular physics class, but the actual difference was minimal. When the actual mean difference scores of the three classes were compared it was noted that the first two classes were almost identical and the Principles of Agri-Technology class was only two points lower.

The greatest conclusion from this data is that students, who probably would have never taken a course in high school physics, did so and achieved learning of principles of physics approximately equal to those in a regular high school physics class. The students in the regular Principles of Technology class were primarily those students in vocational programs, who seldom take a regular high school physics class. The students in the Principles of Agri-Technology class were those students normally in Agricultural Education classes, who very seldom take a high school physics class. These students took an applied physics class under another name and learned the same principles of physics as the students in the regular high school physics class. The difference was that they learned these principles in applications they were familiar with and with which they were comfortable. It would be interesting to know if the principles were retained equally well and applied equally well in later applications by students in all classes.

Educational, Scientific, Practical Importance of the Study

The educational, scientific, and practical importance of this study rests on several factors. The educational importance may not be dependent as much on a new curriculum in physics as it is on how that curriculum is presented and to whom it is presented. Granted, the small numbers limit the analysis of the data from this study. What is most educationally important is that students who would not normally study physics are learning the principles of physics equivalent to their counterparts in regular high school physics. Scientifically, the importance is that more students are studying more science through this curriculum and approach. And practically, these students are able to be better vocational and agricultural students and workers as they are learning how these principles of physics apply to their occupations. This study was designed and carried out by local teachers in their classrooms to see the effectiveness of their new curriculum and approach to teaching physics. This study is a complementary study on a local, practical scale to some of the broader state studies in Alabama (Baker, 1990), Iowa (Dugger, 1989), and Ohio (Harvey, 1992).

The study conducted in Alabama compared students enrolled in PT with those students enrolled in traditional physics (Baker, Wilmoth, and Lewis, 1990. The study consisted of 226 students from PT classes and 306 students from traditional physics classes in Alabama during the 1988-89 school year. The data gathered through pre- and post-tests led to the conclusion that the Principles of Technology course was valid as an academic course, and equivalent to physics in terms of student performance on a standardized test.

In an Iowa State University study (Dugger, 1989) students who used the Principles of Technology curriculum gained more knowledge of basic physics concepts than did traditional physics students.

This two year study consisted of 675 students in 15 Iowa school districts. This study compared PT student performance to student performance of traditional physics. Again, pre- and post-tests were used to determine learner outcomes of the two courses. On the pre-test, traditional physics students scored five points higher than did the PT students. After a post-test was administered the results were different. PT students made up the five points they were behind and then outscored the traditional physics student by 11 points.

The study concluded that, although never intended to replace physics, the Principles of Technology course does a significantly better job in increasing student achievement regarding basic physics concepts.

The Ohio study on the impact of applied academics on the Ohio vocational achievement test scores had 20 vocational schools participate (Harvey, 1991). The researcher investigated the effects of program delivery changes from a traditional model to the applied academics model as measured by student performance. Achievement scores for both juniors and seniors were examined for the years 1985 through 1989. Achievement scores from traditional delivery systems were compared to the scores from the applied academics model. The conclusions from this study showed significant decreases in student achievement in the applied academics model.

This current study's findings were supported by the findings of the Alabama and the Iowa study, which should give more credence to the findings. The Ohio study did not agree with this study or the other two state studies, which raises questions about the differences.

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AGRI-SCIENCE EQUAL TO SCIENCE?

A Critique

Linda Whent, University of California, Davis

I would like to commend the authors for selecting a timely and important topic. The need for science credit for agriculture education classes continues to grow and it is essential that we, as a profession, continue to evaluate new instructional materials that will help our students excel in science.

Theoretical Framework - The authors have provided a thorough discussion of the background and need for this study; however, the theoretical framework was presented at the end of the paper. Perhaps presenting relevant literature in the introduction of the paper would provide the reader with a stronger bases to assess the methodology and findings of this study. The stated purpose of this study was not clear to me. Without reading further, I was not sure if two or three physics curriculums were being evaluated. In addition to the purpose, I recommend adding clearly stated objectives to this section.

Methodology - The authors used a pre-test- post-test quasi-experimental design in this study to test three different physics curriculums. The authors stated that three classrooms were selected based on convenience, availability, one each of the three types of physics curriculum being taught, and the teachers' willingness to cooperate with the study. The authors recognized that the small class size and lack of random selection of classes limited the findings of this study. The authors stated that a 100 item test of physics principles common to both curriculums was constructed by teachers. It was not clear which teachers constructed the test. In addition, I am not clear as to which two curriculums the authors are referring. I would have liked to see greater description of the testing instrument, along with test evaluation and reliability information. Information on the statistical package used to summarize the data needs to be reported.

Findings - The findings of this study indicated that all three groups of students had significant increases in performance from pre-test to post-test and there were no differences between the amount of gains for each group. The students in the regular physics class had the highest pre and post-test scores; students in the vocational principles of technology class had the second highest scores; and the Principles of Agri-Technology students had the lowest scores. The authors speculated that the differences in scores indicated stronger to weaker background in science. It could be that other variables may be contributing to this difference as well. Collection of demographic data such as OPA, English as a second language, educationally handicapped, etc., may prove beneficial. Since this was a selected population and cannot be generalized to a larger audience, it was, in essence, the population and inferential statistics were unnecessary. In addition, I caution the researchers on the use of multiple tests. Comparisons of three or more groups should use analysis of variance rather than t-test analyses as multiple t-tests increase chances of an experiment-wise type I error (rejecting a true hypothesis).

The researchers stated that the greatest conclusion from this study was that students who probably would have never taken a course in high school physics did so and gained knowledge at an equal rate with general physics students. The authors should be commended for their efforts and I encourage them to further their research in this area.

STATUS of SECONDARY AGRICULTURAL EDUCATION COMPUTERS and SOFTWARE

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Introduction

"People don't plan to fail; they fail to plan. Success is often defined as planning and preparation for meeting opportunity. Financial planning is a lifelong process which is necessary to survive in the modern world" (Gioia, 1989). Agricultural Education programs in secondary schools strive to help students not only survive, but be successful in the modern world. Secondary agricultural education programs have three components: students receive vocational-technical education in agriculture, combined with leadership education in FFA and Supervised Experience Programs. Financial management and decision making is a part of each component of agricultural education, and a vital ingredient within agricultural businesses and careers.

Agricultural education is dependent upon the agricultural industry for financial and technical support. Agribusiness leaders were concerned about agricultural education's use of "antiquated record keeping procedures that stressed accumulation of assets and not return on assets and for its recognition of students based on inappropriate financial standards" (Elliot, 1991). Because of the concerns raised by the agricultural industry, a project was started in 1991 to develop curriculum for teaching generally accepted accounting principles (GAAP) in agricultural education programs. The curriculum project was sponsored by the agricultural industry through the National FFA Foundation. The project was directed by The National Council for Agricultural Education with the guidance and assistance of members of the agricultural finance industry, secondary agricultural educators, teacher educators in agricultural education, and state supervisors in agricultural education (Elliot, 1991). A 600 page curriculum, an instructional video tape and software are proposed products.

During the development of the curriculum, the name "Decisions & Dollars" evolved and became the title of the curriculum. An action force made up of leaders in agricultural education at all levels, and the agricultural finance industry, was the driving force behind the Decisions & Dollars curriculum. The Decisions & Dollars FFA subcommittee developed a plan to incorporate the generally accepted accounting principles with the FFA awards system" (Elliot, 1992a). The new FFA awards system would require new applications and new software.

In addition to the FFA software, the Decisions & Dollars instructional software was being planned. The first step in the software development process was to determine the status of computer hardware and software within secondary agricultural education programs. This study provided the Decisions & Dollars director and the National FFA staff valuable information for establishing priorities on software development.

Purpose and Objectives

The purpose of this study was to determine the status and future needs of computers and agribusiness software in secondary agricultural education departments. The specific objectives include:

1. To determine the variety and distribution of computers in secondary agricultural education departments.
2. To ascertain the variety and distribution of school computers available to secondary agricultural education departments for agribusiness activities.
3. To determine the hardware and operating software (Windows) plans for secondary agricultural education departments.
4. To determine ownership and assess the satisfaction of current FFA software.
5. To determine the need and feasibility for record keeping and financial management software in secondary agricultural education departments.

Methods

The research design used for this study was a descriptive survey design. Key individuals associated with the National FFA Center, the National Council for Agricultural Education's Decisions and Dollars curriculum project, and secondary agricultural education departments assisted in the development of the research instrument. The key individuals' input, coupled with the researchers' previous work, provided the most relevant questions for the survey.

Validity was established using a panel of experts that consisted of the Decisions and Dollars action force, National FFA Center staff, and faculty from the Department of Agricultural Education at the University of Arizona. Reliability was established by a pilot test with a like group of teachers not in the sample. Reliability coefficients ranged from .75 to .91.

Random sampling was used to select 370 teachers of agriculture from the 1993 Agricultural Education Teacher Directory. A total of 240 teachers returned completed questionnaires for a response rate of 65%. The Total Design Method (Dillman, 1978) was utilized. A mail questionnaire was used to collect data. The questionnaires were mailed to the sample population during the fall of 1993. A follow-up postcard was mailed one week later, followed by a second mailing of the questionnaire two weeks later. A third follow-up mailing was sent to the non-respondents two weeks later.

Data were analyzed using the Statistical Package for the Social Science (SPSS/PC+). Frequencies, means, standard deviations and qualitative methods were used to analyze data.

Early and late respondents were compared to ensure generalizability to the population. Research has shown that late respondents are similar to non-respondents (Miller & Smith, 1983). Because there was no difference between early and late respondents, the results to this survey can be generalized to the population.

Results and Conclusions

Objective 1

1. Apple computers are the most prevalent computers in secondary agricultural education departments followed closely by IBM/compatible computers (see Table 1).

2. Sixty-eight percent of the secondary agricultural education departments with MacIntosh computers also have IBM/compatible computers (see Table 1).

3. Fifteen percent of secondary agricultural education departments do not have computers in their classrooms.

4. Only 12% of secondary agricultural education departments have their computers on a network or file server.

Table 1

Secondary Agricultural Education Computers: Distribution and Variety

Computer types:	Apple	IBM & compatible	MacIntosh
Percent* of departments with a specific type of computer	51%	47%	17%
Departments also have Apple computers		37%	27%
Departments also have IBM/compatible computers	34%		68%
Departments also have MacIntosh computers	23%	10%	

* Percentage totals are greater than 100% because many departments have multiple types of computers.

Objective 2

5. IBM/compatible computers are the most prevalent computers available in schools for secondary agricultural education departments to use for agribusiness activities (see Table 2).

6. Seventy-one percent of the schools that have Apple computers and 65% of the schools that have MacIntosh computers available for secondary agricultural education departments to use for agribusiness activities also have IBM/compatible computers (see Table 2).
7. Of the secondary agricultural education departments (15%) that do not have computers in their classrooms, only 23% utilize school computers for agribusiness activities.
8. Thirty-five percent of the schools do not have computers available for secondary agricultural education departments to use for agribusiness activities.

Table 2

Variety and Distribution of School Computers Available to Secondary Agricultural Education Departments

Computer types:	Apple	IBM & compatible	MacIntosh
Percent* of schools with a specific type of computer	34%	50%	28%
Schools also have Apple computers		49%	60%
Schools also have IBM/compatible computers	71%		65%
Schools also have MacIntosh computers	50%	37%	

* Percentage totals are greater than 100% because many schools have multiple types of computers.

Objective 3

9. Almost half of the secondary agricultural education departments have plans to increase their number of computers within the next two years and two-thirds of the computers to be purchased are IBM/compatible computers (see Figure 1).

10. Thirty-six percent of the departments plan to add a printer within the next two years. However, only 20% of the new printers will be laser printers.

11. One-fourth of all secondary agricultural education departments currently use Windows version 3.0 or higher.

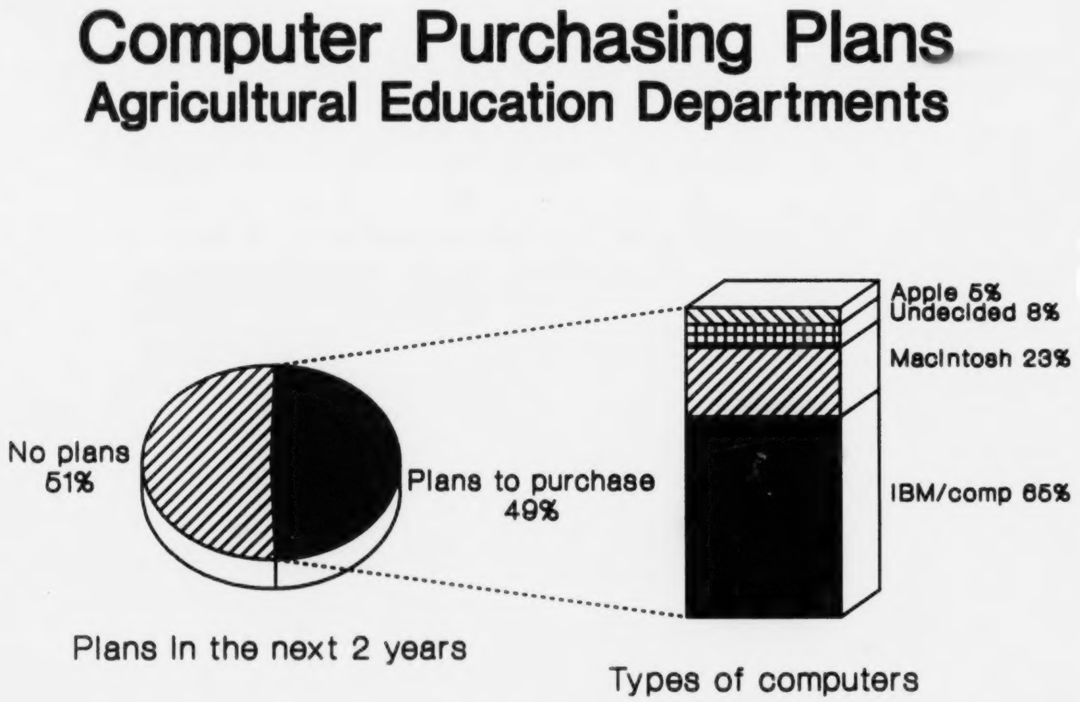

Figure 1. What are the plans for increasing the number of computers in secondary agricultural education departments?

Objective 4

12. The American FFA Degree software is owned in 29% of the secondary agricultural education departments.

13. The Agricultural Proficiency Award software is owned in 32% of the secondary agricultural education departments.

14. The National Chapter Award software is owned in 17% of the secondary agricultural education departments.

15. The respondents were satisfied with all three FFA software programs, with the technical support for the FFA software programs, and with the sales support provided by the FFA Ventures Supply Service Marketing Group (see Table 3 for breakdown of the written comments).

Table 3

Comments on FFA Software

Category	Number	Examples
Positive	14	Very efficient and useful. Works well and is user friendly. Makes the applications easier to complete.
Neutral	14	Can't give an accurate answer. Do not own a copy. School and students not interested in AG!
Negative	13	Not friendly at all. Students cannot do this alone. Bugs need to be worked out before ship. Limits your creative ability. Could be a little faster.
Suggestions	6	Merge data between programs. Cost must be kept low. Local copying without extra cost.

Objective 5

16. The number of educators teaching record keeping and financial management is high, 83% and 72% respectively (see Figures 2 & 3).

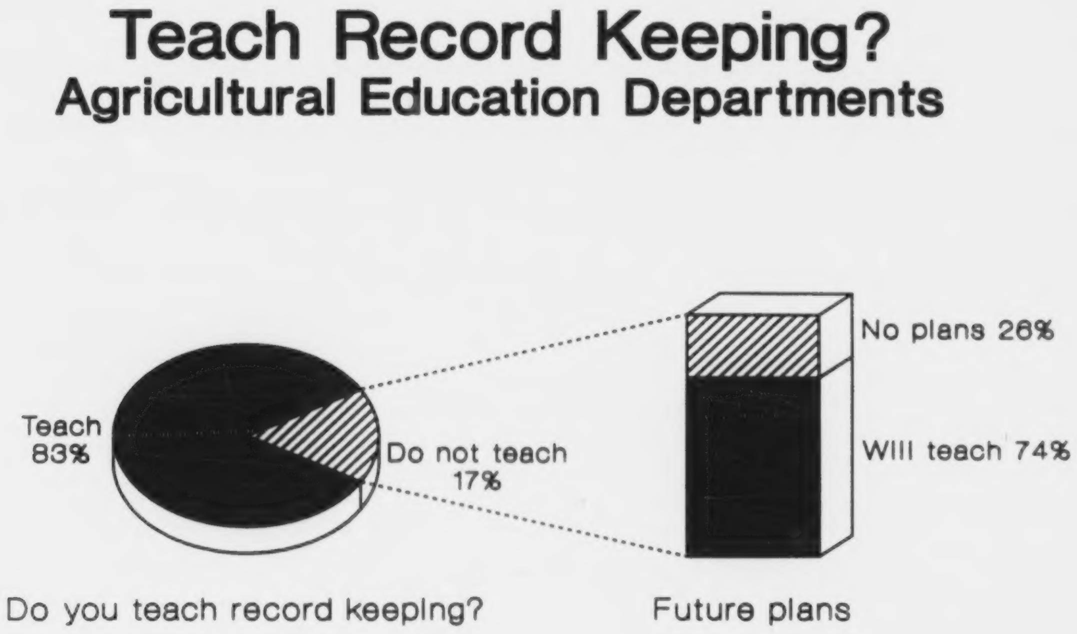

Figure 2. Is record keeping taught within the agricultural education department?

17. The respondents were interested in:

   a. a computerized record keeping system that complements the new Decisions & Dollars curriculum.

   b. purchasing new FFA computer programs that correspond with the upcoming FFA award application revisions.

   c. purchasing one computer program that would keep student financial records and generate FFA award applications.

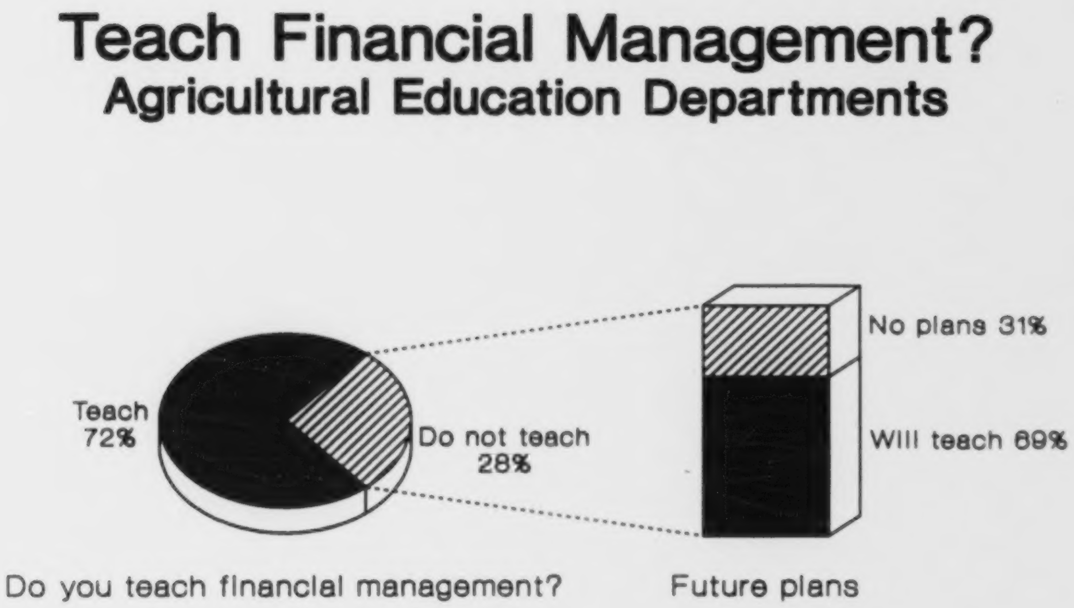

Figure 3. Is financial management taught within the agricultural education department?

18. The respondents were only somewhat interested in purchasing three separate computer programs: computerized record keeping system, FFA proficiency application and American FFA Degree application.

19. Over sixty-two percent of the secondary agricultural education department computer budgets are less than $250. Respondents overwhelmingly (62, 72 and 74%) selected the lowest price ranges for future software packages.

20. Ninety-three percent of the secondary agricultural education programs have FFA members, 76% completed Agricultural Proficiency Award applications, and 47% completed American FFA Degree applications.

Educational and Practical Importance of the Study

1. The entire agricultural education profession will be impacted by this study because the new FFA awards and applications, along with the Decisions & Dollars project, have software programs being developed. It is imperative that products be developed that meet the needs of the profession.
2. The primary computer system for the future in secondary agricultural education departments is IBM/compatibles. This information supports the production of IBM/compatible software prior to the development of software for other systems. Even if new computers are developed that are compatible with any type of software, it is safe to assume that educational institutions will be many years behind industry standards. For example, only 14% of the secondary agricultural education departments currently own 486 IBM/compatible computers.
3. The respondents favored the production of one computer program that would keep student financial records and generate FFA awards applications and 72% of the departments could afford it. This message has great implications for the profession. The local agricultural education curriculum, student supervised experiences, and FFA activities would be integrated on one software program, much like the three circles that are integral to a complete agricultural education program.
4. Opportunity to increase the number of departments that utilize FFA software exists. Forty-seven percent of the departments apply for American FFA Degree, but only 29% own the software. Likewise the for Agricultural Proficiency Awards the figures are 76% complete applications, but only 32% own it.

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STATUS OF SECONDARY AGRICULTURAL EDUCATION COMPUTERS AND AGRIBUSINESS SOFTWARE

A Critique

Linda Whent, University of California, Davis

Theoretical framework -- This descriptive survey design study assessed the current status and future needs of computers and agribusiness software in secondary agricultural education departments. The background and need for the study was established. An adequate theoretical base was selected for the research. The purpose and objectives of the research were clearly stated. Methodology -- The procedures were explicitly described. There was a complete sample frame, and adequate sample selection and control for non-response error. A mail questionnaire was used to collect data using the Dillman, Total Design Method. Instrument validity and reliability were reported. I would have liked to see information about the contents of the questionnaire. What scales were used? Were open-ended questions provided?

Findings -- The findings followed the purpose and objectives of this study. Findings were generalized to the population. The findings were presented in a clear, concise manner. Table and graphics were well done. It would be helpful to the reader if objectives were repeated in the headings of the results section. Apple computers are the most prevalent computers in secondary agricultural education, however, IBM/compatible computers are the most prevalent computers available in departments to use for agribusiness activities. Why? Of those departments that plan to purchase computers (50%), two-thirds plan to purchase IBM/compatible computers in the future. When presenting the results on Objective 5, to determine the need and feasibility for record keeping and financial management software in secondary agricultural education departments, the researchers failed to present means, percents, or numerical values. Perhaps a table was removed for space considerations. The researchers reported that respondents were only somewhat interested in purchasing three separate computer programs. In the conclusion section they reported that respondents favored the production of one computer program to maintain student financial records and generate FFA awards. It is suggested that the researchers present data results prior to forming these conclusions.

The data report that 47% of the agricultural education departments have IBM/compatible computers and 50% of the respondents have IBM/compatible computers available to them in their school. What is the overlap in this area or what percent of the teachers have IBM/compatible computers available for their use? In addition, the researchers state that of the teachers surveyed, 50% plan to purchase computers in the future and of those, 63% plan to purchase IBM/compatible computers. From these results, the researchers concluded the primary computer system for the future in secondary agricultural education departments is IBM/compatible. This information, therefore, supports the production of IBM/compatible software prior to the development of software for other systems. Was information obtained from schools without IBM/compatible computers regarding changing computer systems in future purchases, or can it be speculated that those departments and schools that have IBM/compatible computers plan to purchase more of the same? If so, then are we still not addressing the computer needs of close to half the agricultural education profession? The researchers should be commended for addressing a timely and important topic. Findings from this and similar studies may guide the future of agriculture education software production.

HOW VIDEOTAPE IS USED BY TEACHERS OF AGRICUTULTURAL SCIENCES IN SECONDARY SCHOOLS

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INTRODUCTION AND THEORETICAL FRAMEWORK

Media technology has become an important part of today's educational environment (Marsh, 1987). Recent development and improvement of instructional technologies have given instructors of secondary agricultural sciences greater access to instructional media (Birkenholz and Stewart, 1991). Many programs have access to microcomputers, slide projectors, videotape players, overhead projectors and other types of instructional media. Sources for these items include school-owned equipment, equipment owned by the agricultural sciences department and the teacher's personal equipment.

One technology of interest to educators is the VCR. Videotape has many applications as a teaching tool and its uses in the classroom are expanding (Tannahill, 1989). A wide variety of uses for video equipment and materials have been created in classrooms across the country (Marsh, 1987). Reider (1987) said, "The VCR will predictably become the most significant instructional tool since the textbook" (p. 16). The number of schools using instructional video in agricultural sciences classrooms also continues to grow.

Despite the emphasis placed on microcomputers in the 1980s, the rate at which schools are acquiring VCRs is expanding at a rate greater than school acquisition of microcomputers (Reider, 1987). Botterbusch (1991) reported that a recent national survey of 500 teachers indicated that "more of the nation's teachers are turning to television and video to enhance learning" (p. 22). It was predicted that by the 1992-1993 school year, the number of schools in the United States utilizing VCR technology would grow to 98% (QED, 1993).

The possibilities for the use of videotape in education and teaching are still being studied (Ault and Agee, 1988). In light of the increasing rate at which technology advances and the increased availability of the existing media, it is important to know the extent of the use of instructional media in today's classroom. By knowing the present uses instructors have for videotape and other instructional media, new and better ways to use the media can be developed.

The discovery of new methods to incorporate videotape into the teaching of agricultural sciences concerns many agricultural educators (Birkenholz and Stewart, 1991). To better develop new educational videotape programs and the accompanying instructional materials for use with the new videotapes, a thorough understanding of the current uses of videotape must be obtained. The further development of videotape as an instructional media for use in classrooms depends upon an accurate assessment of the current utilization by teachers. Therefore, the central problem of the study was: To what extent do instructors use videotape as an instructional medium in secondary agricultural sciences programs in the United States?

PURPOSE AND OBJECTIVES

The purpose of this study was to provide an accurate assessment of the use of videotape as an instructional medium in secondary agricultural sciences programs. The following objectives were developed to accomplish this purpose:

1. Identify the instructional technologies available to secondary agricultural sciences instructors.
2. Determine how videotapes are used as an instructional medium in secondary agricultural sciences programs.
3. Assess teacher needs concerning the use of videotapes in secondary agricultural sciences programs.

PROCEDURES

The population for this study was all secondary agricultural sciences teachers in the United States of America. The National Vocational Agricultural Teachers Association (NVATA) reported the number of agricultural science teachers on the secondary level for the 1992-1993 school year was an estimated 10,200. A systematic sampling technique was used to select the subjects for the study by selecting every twenty-eighth teacher from the Agricultural Teachers Directory (Henry, 1991). The starting point for the systematic sampling was chosen by using a list of random numbers. Three hundred seventy-six teachers were selected to receive the mailed questionnaire. The number of teachers selected was in accordance with Krejcie and Morgan's (1970) recommendations.

The instrument used in the study was a survey questionnaire developed by the researchers. The instrument was developed with the assistance of a panel of experts composed of faculty and graduate assistants in agricultural education and communications and the staff of a major video production company. It consisted of 28 items developed to meet each of the research objectives.

The instrument was pilot tested with a group of secondary agricultural science instructors who were not included in the sample to determine content and face validity. The internal consistency of the instrument was measured by performing the SPSS® procedure RELIABILITY. This produced a Cronbach's alpha of .90.

A packet of materials that included the instrument and related items was sent to each of the members of the sample group on March 12, 1993. Three follow up notes were sent with the second containing another copy of the instrument. The data collection phase was concluded on May 1, 1993. Any completed questionnaires received after that date were not included in the data.

As an incentive to respond early, members of the sample were offered a $50.00 coupon to apply toward their next video purchase. Questionnaires that were returned by the deadline were later sent a coupon from Creative Educational Video, the largest vendor of educational videos for agricultural sciences in the nation. Completed questionnaires were received from 195 teachers yielding a response rate of 52%.

Completed instruments were placed into three groups based upon when they were received from the respondents. A wave analysis was conduced to determine if there were any differences between early and late respondents in accordance with procedures recommended by Miller and Smith (1983). No significant differences were found between the early and late respondents on any variables. In addition, the same data collection process was used with a second sample drawn from the population. No differences were found between the original respondents and those from the second group. Based on the findings of these two procedures, results were generalized to the population.

Data were analyzed using SPSS® for the Macintosh® personal computer.

RESULTS

Instructional Technologies Available

An inventory of the instructional media available to instructors was established by determining the number of selected media owned by the school, the agricultural sciences department or the instructor. For each medium, the school owned the greatest amount of the equipment available to the teachers. Computers were the most commonly available instructional medium. Slightly more than 35 per teacher were available from the school, an average of 2.28 were owned by the department, and one in five used their personal computers in class. Computer printers, VHS videocassette players, televisions, slide projectors, and film strip projectors were also abundantly available. Of least availability were satellite receivers, 3/4 inch videocassette players, interactive video, and Beta videocassette players. These data are presented in Table 1.

Teachers were asked to indicate which of the 14 selected instructional media they commonly used in the classroom. These data are shown in Table 2. More than 98% of the teachers indicated they used the VCR for instructional purposes. The overhead projector was used for instruction by more than 90% of the teachers, slide projectors were used by approximately 90% of the teachers, and almost three-fourths of the teachers used the computer for instructional purposes.

The educators were also asked to rank the 14 selected media based upon the amount of time they used that medium for classroom instruction. Approximately 40% of teachers ranked the VHS player first, indicating this medium is used most often for classroom instruction. Slightly less than 30% ranked the overhead projector first and approximately 20% ranked the computer first. The VHS player was also ranked second by approximately 24% of the teachers. The slide projector received second place votes from nearly 22% of the teachers. The computer was placed second by approximately 11% of the teachers.

Table 1
Mean Inventory Of Selected Educational Media In Agricultural Sciences Classrooms

	Mean Number of Educational Media Available/Source			
Media	Department Owned	School Owned	Teacher Owned	Total Available
Computer	2.28	35.57	0.23	38.08
Computer Printer	1.73	16.27	0.16	18.16
VHS Videocassette Player	1.03	9.57	0.37	10.97
Television	0.99	13.41	0.34	14.74
Overhead Projector	0.99	12.70	0.01	13.76
Slide Projector	0.97	4.55	0.04	5.56
Film Strip Projector	0.64	4.68	0.01	5.33
Audio Cassette Player	0.58	5.77	0.22	6.57
Computer Modem	0.49	3.08	0.03	3.60
Monitor	0.37	2.57	0.03	2.97
16 mm Film Projector	0.32	3.10	0.01	3.43
VHS Camera	0.30	2.06	0.12	2.48
Large Screen Television	0.15	1.22	0.02	1.39
Opaque Projector	0.13	1.32	0.00	1.45
Satellite Receiver	0.06	0.57	0.01	0.64
3/4 inch Videocassette Player	0.05	0.72	0.03	0.80
Interactive Video	0.05	0.71	0.00	0.76
Beta Videocassette Player	0.00	0.14	0.01	0.15

N=148

Use of Videotape as an Instructional Medium

Table 3 displays the subject areas in which teachers were using videotapes. Slightly more than 82% of teachers used tapes for instruction in Animal Science and FFA. Tapes on Agronomy, Leadership/Personal Development, Conservation/Ecology, Careers, Mechanized Agriculture, and Wildlife Science were used by more than 60% of the teachers. Less than half the teachers used videotapes for instruction in subjects relating to Soil Science, Agricultural Management and Supervised Agricultural Experience Programs.

Table 2
Teachers Who Used Selected Educational Media For Instructional Purposes

Medium	Frequency[a]	Percent
VHS Videocassette Player	186	98.4
Overhead Projector	171	90.5
Slide Projector	169	89.4
Computer	137	72.5
Film Strip Projector	135	71.4
Computer Printer	113	59.8
VHS Camera	95	50.3
16 mm Film Projector	92	48.7
Audio Cassette Player	87	46.0
Computer Modem	43	22.8
Large Screen Television	30	15.9
Opaque Projector	26	13.8
Satellite Receiver	27	14.3
Interactive Video	10	5.3

[a] N=189

Table 3
Subject Areas In Which Teachers Use Videotape

Subject	Frequency[a]	Percent
Animal Science	158	82.3
FFA	158	82.3
Agronomy	151	78.6
Leadership/Personal Development	130	67.7
Conservation/Ecology	123	64.1
Careers	122	63.5
Mechanized Agriculture	120	62.5
Wildlife Science	116	60.4
Soil Science	87	45.3
Agricultural Management	64	33.3
SAE	56	29.2

[a] N=192

Teachers were asked to indicate the number of videotapes to which they had access in each of the subject areas in agricultural sciences. They had access to the greatest number of tapes on the subject of Animal Science (8.00) followed by Agronomy (4.70) and Mechanized Agriculture (3.90) and FFA (3.82). The teachers had least access to tapes in the area of SAE (0.48) followed by Soil Science (1.72) and Careers (2.11). These data are displayed in Table 4.

Table 4
Number of Videotapes Available in Each of the Subject Areas

Subject	Mean	sd
Animal Science	8.00	9.19
Agronomy	4.70	7.02
Mechanized Agriculture	4.64	7.62
FFA	3.90	3.05
Wildlife Science	3.82	5.67
Conservation/Ecology	2.34	4.14
Leadership/Personal Development	2.31	3.02
Careers	2.11	3.41
Agricultural Management	1.72	5.43
Soil Science	0.96	1.96
SAE	0.48	1.16

The total number of videotapes owned by the agricultural sciences department ranged from 0 to 300 and the mean number of videotapes was 33.36. Only 2.6% reported that the agricultural sciences department owned zero videotapes. The number of videotapes owned by the school in which the instructor taught ranged from 0 to 998 and the mean number of videotapes was 55.04. The number of videotapes from personal collections used in teaching ranged from 0 to 75, and the mean number of videotapes was 5.92. The number of videotapes available from state or regional service centers ranged from 0 to 900 and the mean number of videotapes was 17.83. Slightly more than 73% of teachers reported that zero videotapes were available from service centers.

Table 5 displays the sources from which teachers acquired videotapes. Approximately 75 percent of teachers bought videotapes from commercial suppliers. Nearly 70% received videotapes free from a commercial supplier. Another 53.9% copied television programming as a source for videotaped material. However, slightly more than 16% of teachers rented videotapes from a retail rental store and 12.4% rented videotapes from universities. Slightly more than 6% of teachers rented videotapes from the Extension Service or copied commercial videotapes.

The ways that teachers use videotape were also researched. The primary classroom use for videotapes was to supplement classroom lecture. Approximately 86% of teachers used videotapes for this purpose. Nearly 74% used videotapes to introduce new material and train judging teams.

Table 5
Sources of Videotapes

Source	N[a]	Percent
Buy from a commercial supplier	145	75.1
Free from a commercial supplier	131	67.9
Copy from television programming	104	53.9
Free from universities	82	42.5
Produce own tapes	76	39.4
Free from Extension Service	76	39.4
Copy from other agriculture teachers	65	33.7
Borrow from Extension Service	65	33.7
Borrow from universities	50	25.9
Rent from local video retailer	38	19.7
Rent from a commercial supplier	32	16.6
Rent from universities	24	12.4
Rent from Extension Service	12	6.2
Copy from commercial tapes	12	6.2

[a] N=193

Slightly more than 67% of teachers used videotapes to provide material for a substitute teacher. Nearly 19% used videotapes to allow students to make up for lost class time and only 13.9% indicated the use of videotapes to fill class time (see Figure 1).

Inquiries were made concerning the number of hours per year the teacher used videotapes in the classroom. The number of hours ranged from 3 to 990, and the mean amount of time was 51.57 hours. Slightly more than 41% spent from 3 to 20 hours per year showing videotapes in classes. Approximately 28% showed videotapes 21 to 40 hours per year and 14% spent 41 to 60 hours of class time per year showing videotapes. Nearly 17% of the teachers showed videotapes for more than 60 hours per year. No teachers indicated they used videotape less than three hours in a normal year.

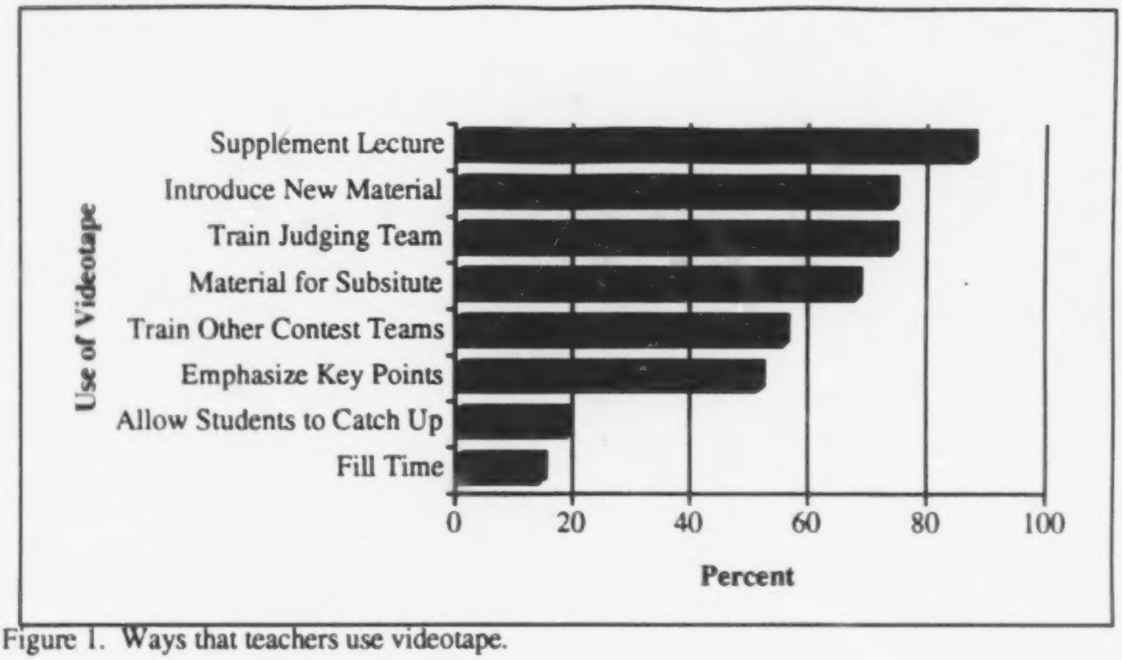

Figure 1. Ways that teachers use videotape.

Teachers Needs Concerning the Use of Videotape

A majority of teachers (58.8%) indicated their use of videotapes would increase in the future. None of the teachers felt their use of videotapes would decrease, and slightly more than 41% indicated their use of videotapes would remain about the same.

The data in Table 6 show the barriers preventing teachers from using videotapes for instructional purposes. The most cited barrier was lack of funds (74.2%). Lack of videotapes, quality of videotapes, and needed videotapes not being produced was a barrier for more than 40% of the teachers. Less than 6% indicated that lack of equipment and lack of interest were barriers preventing greater use of videotapes. Fewer than 4% of the teachers cited outdated equipment as a barrier.

Table 6
Barriers Preventing Teachers from Using More Videotapes for Instructional Purposes

Barrier	N[a]	Percent
Lack of funds	141	74.2
Lack of videotapes	83	43.9
Quality of videotapes	80	42.3
Videotapes not produced	77	40.7
Videotapes are outdated	49	25.8
Lack of knowledge	21	11.1
Lack of equipment	11	5.8
Lack of interest	11	5.8
Equipment outdated	7	3.7

[a] N=189

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

1. Agricultural science teachers have access to a wide variety of modern instructional media, most of which is owned by the school. Of greatest abundance is computer equipment and equipment used to show videotapes.
2. Videotape is a very important instructional media. Virtually all teachers use videotape in the classroom. In fact, it is used more than any other instructional media.
3. Videotape was used in each area of the agricultural sciences curriculum. It is of most use in the teaching of animal science, FFA, agronomy, and leadership.
4. Virtually all of the agricultural sciences departments own videotapes. Most programs have more than one tape in each of the subject areas of agricultural sciences.
5. Teachers primarily acquired videotapes from commercial videotape suppliers, however, a majority of teachers also used videotape material recorded from television programming.

6. Videotape is used for a variety of purposes in agricultural science programs. The primary purpose is to enhance teaching, however, a majority of the teachers also use it to train FFA contest teams and provide material for substitute teachers.

7. Virtually all agricultural science teachers expect to use videotape in the future at least as much as they do now. The majority expect to use the medium at higher levels than it is currently being used.

8. The largest barrier preventing teachers from using more videotapes is lack of funds. However, a lack of needed videotapes and the quality of tapes available also hinder the use of the medium.

Recommendations

1. Because of the availability and popularity of modern teaching equipment, pre-service teacher training should include instruction on the appropriate use of videotape and other instructional media.

2. Since virtually all agriculture teachers are using videotape, teachers should be aware of how to implement the use of this media for all subjects in the discipline.

3. Barriers to teachers not using videotape included lack of funds to purchase tapes and questions about the availability and quality of videos for agricultural science. There is, in fact, a large number of high quality tapes available from a variety of vendors. Teachers should make efforts to become aware of videos available for all subject areas in agricultural science and budget funds to purchase videotapes.

4. Related to the above recommendation, videotape producers and vendors should publicize the variety, quality, and affordability of their products and continue to produce new tapes in all subject areas of agricultural sciences.

5. Research should be conducted to determine the effectiveness of using a videocassette player and videotapes in the teaching of agricultural sciences. Due to the fact that videotapes are primarily used to supplement the work of the teacher

and not to supplant the teacher, research comparing videotape to other instructional media, not to other teaching methods, should be conducted.

6. The rate of adoption of videotape players and videocassettes into education continues to grow. Further studies such as this one should be conducted periodically to monitor the growth and development of this medium as it relates to the agricultural sciences.

7. Research similar to this should be conducted on the use of other instructional media -- especially emerging media such as interactive video, satellite classes, and interactive computer programs.

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HOW VIDEOTAPE IS USED BY TEACHERS OF AGRICULTURAL SECONDARY SCHOOLS

A Critique

Linda Whent, University of California, Davis

The authors should be commended for addressing a growing industry in education and providing the extra effort to conduct a national study such that national baseline information was established.

Theoretical framework -- This descriptive study assessed the use of videotape as an instructional medium in secondary agricultural science programs. An appropriate theoretical base was selected for the research. The investigation provides linkages to related disciplinary based research and incorporates previous research within agricultural education. The purpose and objectives of the research were clearly stated.

Methodology -- The procedures were explicitly described. There was a complete sample frame and control for non-response error. Sample selection was based on Krejcie and Morgan's (1970) recommendations. Three hundred seventy-six teachers were mailed questionnaires from a population of 10,200. A response rate of only 52% was received even though the researchers offered a $50 coupon toward a video purchase for early respondents. It is suggested that the researchers may have increased the sample size in anticipation of non-respondents. Instrument validity and reliability were firmly established.

Findings -- The findings are clearly written and presented. Findings were generalized to the population. The findings indicated a majority of agricultural instructors currently used videotapes in their classrooms and the use of videotapes would increase in the future. The findings suggested that a majority of teachers use videos to train FFA contest teams and as material for substitute teachers. The authors stated that videotapes are primarily used to supplement the work of the teacher and not to supplant the teacher. Thus, research comparing videotape to other instructional media, not to other teaching methods, should be conducted. As the use of videotape continues to increase, could the medium be used more and more to replace the teacher?

It was interesting to note that teachers reported the largest barrier to preventing them from using more videotapes is lack of funds and a lack of needed videotapes. Yet the researchers reported that there is, in fact, a large number of high quality tapes available from a variety of vendors. The researchers suggested that teachers should make efforts to become more aware of available videos. Perhaps teaching institutions or state departments of education could make this information available to its teachers through catalogues, E. Mail, etc.

I commend the researchers for undertaking this important national study and encourage them to continue their research in this expanding area.

4-H YOUTH PARTICIPATION IN LEADERSHIP DEVELOPMENT ACTIVITIES - A TRI-STATE STUDY

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Introduction and Theoretical Base

Adolescents today are faced with changing family structures, conflicting lifestyles, substance abuse, increased crime, and isolation from adults. It is during this time of rapid social, physical, emotional and cognitive growth, known as adolescence that most of life's significant social and personal changes occur.

Descriptions of the adolescent vary with age spans ranging from age nine to the early twenties. In addition to age, however, is a perception of adolescence as a waiting period. It is seen as a time when youth are no longer children, yet they are not yet considered to be adults. Adolescents are transitional beings in preparation for adulthood, acquiring knowledge, skills, and information to be applied at some future time (Dollar, 1976). Adults continually remind youth that the future of the world will be in their hands tomorrow.

However, young people in this period of development need, just as adults, to feel they are accepted members of their communities (Coskin, 1976). Lofquist, (1987, p.1) says, "For too long we have seen adolescence as a nonproductive time of life, a time only for **becoming** and not a time for **contributing.** We have asked young people to prepare for what they can do in the **future**, and we have not respected them for what they can do for themselves and others in the **present.**" Adolescence is not preparation for life. It is life. (Lipsitz, 1983).

Formal and nonformal education programs effectively utilize experiential learning. Participation in youth programs provide young people the opportunity to work with other youth and adults, set goals and priorities, accept responsibility, and participate in planning, decision-making and evaluation (Dept. HEW, 1977). The mission of the 4-H program is "to help youth and volunteers in their development through educational programs using the knowledge base of the land grant universities of the United States." (USDA, 1986, p. 4). Commitment to the mission involves supporting specific program objectives including helping youth develop leadership capabilities, personal standards and values, positive self concepts, and effective communication skills. (USDA, 1986, p. 5). A general perception prevails that participation in a variety of activities or programs such as public speaking or holding office develops leadership life skills and understanding. The question remains - How accurate is this perception?

Miller (1976, p.2) defined youth leadership life skills development as self-assessed and organization specific "development of life skills necessary to perform leadership functions in real life." Seevers and Dormody (1993) found participation in 4-H leadership activities to be the greatest predictor of youth leadership life skills development among senior 4-H members in New Mexico, Arizona, and Colorado. A similar study by Dormody and Seevers (1993) with FFA youth in the same three states supported these findings. Mueller (1989) found a positive relationship between participation in 4-H leadership activities and youth leadership life skills development. A Michigan study (CES, 1976) found leadership skills are learned through participation in 4-H activities and projects that provide youth the opportunity to participate in trial leadership roles. Taylor, Adleman, & Howard (1986) found that children as young as eight years old can participate in the decision making process as long as appropriate adult guidance is provided.

Little research, however, has been conducted on the participation of youth in planning, implementing and evaluating leadership activities in which they participate. Mueller (1989) found senior 4-H members participated more in the implementation phase of leadership activities than in planning or evaluation. In FFA, Dormody and Seevers (1993) found FFA members in Arizona, Colorado and New Mexico were also more involved in implementation than planning or evaluation phases of leadership activities. Level and degree of participation is a factor to consider in leadership life skills development. Heinsohn and Cantrell (1986) found in a study involving 761 Pennsylvania 4-H youth that only 41% indicated involvement in leadership roles at the county level and 17% at the state level; while 92% of the leadership roles took place with the club program. They concluded the greatest impact on leadership life skill development would be made by increasing youth involvement in leadership experiences beyond the community club level.

More research is needed to determine levels of participation in leadership activities of 4-H members', leadership activities perceived to be most effective in developing life skills; and 4-H members' participation in planning, implementing, and evaluating leadership activities.

Purpose and Objectives

The purpose of this study was to describe the involvement of 1992-93 senior 4-H members from Arizona, Colorado, and New Mexico in planning, implementing, and evaluating 4-H youth leadership activities. Specific objectives of the study were:

1. To describe 4-H members by their years in 4-H, age, gender, ethnicity, and place of residence.
2. To describe 4-H members by the 4-H leadership activities in which they participate.
3. To describe 4-H members by their perceptions of which 4-H leadership activities made the greatest contribution to youth leadership life skills development.
4. To describe 4-H members by their involvement in the planning, implementation, and evaluation of 4-H leadership activities perceived to have made the greatest contribution toward leadership life skills development.
5. To determine if differences exist between the frequencies that 4-H members participate in the planning, implementation, and evaluation phases of 4-H leadership activities perceived to have made the greatest contribution to leadership life skills development.

Procedures

1992-93 senior 4-H membership rosters were obtained from state 4-H Offices in Arizona, Colorado, and New Mexico. The population of 4-H members in the three states was calculated to be 8,257. At a 95% confidence level a sample size of 367 was needed to represent the population (Krejcie & Morgan, 1970). This number was rounded to 400 (the confidence level increases slightly to 95.2% with this oversampling). A random sample of senior 4-H members, stratified proportionally by state, was generated.

The study used descriptive survey methodology to measure participation in 4-H leadership activities, perceptions of which 4-H leadership activities have made the greatest contribution to leadership life skills development, and participation in planning, implementing, and evaluating 4-H leadership activities perceived to have made the greatest contribution to leadership life skills development.

All parts of the instrument and a parallel instrument for FFA were assessed for content and face validity by a panel of experts consisting of two faculty members in vocational education, two state Cooperative Extension Service administrators, a faculty member in educational administration, and two faculty members in research and statistics.

Participation in 4-H leadership activities was measured by a 21-indicator index adapted from Mueller (1989), which listed 4-H leadership activities by various levels of participation ranging from no participation through individual, club, county/district, state, and national participation, depending on the activity. Scores on the participation index can range from 0 to 68. Additionally, participants were asked to choose and rank three leadership activities from the participation index they perceived to have helped them the most in developing leadership skills. For each of the three activities identified, they were to indicate whether or not they helped to plan, implement, and/or evaluate the activity. A two-week test-retest procedure with 19 youth who were not a part of the sample yielded a reliability coefficient of .97 for the index.

Data were collected from March through June 1993 following the Dillman (1978) procedure for mail questionnaire administration. Incentives were sent with the three mailings to increase response rate. A response rate of 59% (n=234) was obtained. To check for nonresponse bias, 10 nonrespondents were contacted by telephone. Nonrespondents were compared statistically to respondents by youth leadership life skills development (Seevers and Dormody, in press), years in 4-H, age, gender, ethnicity, place of residence, and state. No significant differences were found in any of the categories between groups. Miller and Smith (1983) suggest because the data were similar, respondent data can be generalized to the population.

Objectives one through four were analyzed using descriptive statistics (i.e., means, medians, modes, standard deviations, ranges, frequencies, and percentages). Objective five was analyzed using McNemar tests for significance of change. A significance level of 0.05 was established a priori for the tests.

Results

Objective 1

The number of years 4-H members had been in 4-H ranged from one to eleven with a mean of 5.9 years (sd=2.8) in the organization. 4-H members' ages ranged from 12 to 20 with a mean of 16.3 (sd=1.4) years of age.

Minority 4-H members consisted of 10.5% (n=24) of the sample. 4-H members who lived on a farm or ranch comprised 44.3% of the sample. Another 33.3% were either rural non-farm/ranch residents or from a town under 10,000 in population. 4-H members were 59.2% (n=135) female and 40.8% (n=93) male.

Objective 2

4-H members identified level of participation in 4-H activities by circling the response that indicated their highest level of participation. Choices ranged from no participation through individual, club, county/district, state, and national, depending on the activity. Participation was greatest for most activities at the club level and the county/district levels. Participation was greatest in fairs (n = 199), demonstrations (n = 189), teaching younger members (n = 184), and community service projects (n = 175). Other activities with relatively high participation include holding office (n = 158), committee member (n=151), livestock shows (n=148), and participation in project workshops (n=142) (Table 1).

Table 1
4-H Members Levels of Participation in 4-H Leadership Activities (n=213)

				Level of Participation			
Activity	None	Individual	Club	County/District	State	National	Total Part.
Fairs	15	--	--	94	105	--	199
Demonstrations	24	24	91	53	21	--	189
Teach younger members	29	43	80	51	10	--	184
Comm. service proj.	38	8	95	72	--	--	175
Holding office	55	--	111	47	--	--	158
Committee member	62	6	81	54	9	1	151
Livestock shows	65	12	9	78	37	12	148
Project workshops	71	18	51	50	23	--	142
Judging contests	100	13	16	40	37	7	113
Public speaking	100	14	41	43	14	1	113
Natl. 4-H Week	123	6	44	34	6	--	90
Officer trng.	134	--	35	44	--	--	89
Food shows	155	6	8	36	8	--	58
Camping prog.	158	--	--	35	20	--	55
J.O.L.T.	161	--	--	--	53	--	53
Fashion shows	165	3	5	28	12	--	48
Nat. 4-H Conf.	177	--	--	--	35	1	36
Citizenship Days	185	--	--	--	28	--	28
Citizenship Focus	196	--	--	--	--	17	17
Ambassador prog.	205	--	--	6	2	--	8
Nat. 4-H Congress	207	--	--	--	--	7	7

* A dash (-) indicates activity was not offered at that level.

Objective 3

Members selected and ranked the top three activities from the 21-item leadership activities index they felt contributed the most toward their leadership life skill development. Activities identified as the top developers of leadership life skills were holding office, teaching younger members, fairs, livestock shows, judging contests, demonstrations, public speaking, and community service. A more standardized measure of the perceived leadership development value of the activities was determined by dividing the overall participation frequency in activity by the frequency each activity was identified in the members' top three leadership activity choices. The highest ratios obtained were for holding office (.58), teaching younger members (.53), Washington Citizenship Focus (.53), Ambassador program (.50), and judging contests (.50). (Table 2).

Table 2
4-H members' perceived involvement in the planning, implementation, and evaluation of the 4-H leadership activity identified as contributing most toward YLLSD. (n=213)

Planning	Implementing		Evaluating		Total	Total			
Activity	No	Yes	No	Yes	No	Yes	Top 3	Part.	Ratio
Holding office	14	29	1	42	9	34	91	158	.58
Teaching younger members	11	20	-	31	8	23	80	151	.53
Fairs	14	7	3	18	9	12	74	199	.37
Livestock shows	13	6	5	14	11	8	72	148	.49
Judging contests	11	7	1	17	3	15	57	113	.50
Demonstrations	3	14	-	17	3	14	44	189	.23
Public speaking	3	9	1	11	6	6	36	113	.32
Community service	3	7	1	9	2	8	35	175	.20
Committee member	10	19	1	28	12	17	29	151	.19
J.O.L.T.	19	1	7	13	2	18	20	53	.38
Camping	9	9	3	15	4	14	18	55	.33
Project workshops	9	9	4	14	7	12	18	142	.13
National Conference	13	0	3	1	5	8	13	36	.36
Food Shows	6	4	2	8	6	4	10	58	.17
Citizenship Focus	9	0	1	8	1	8	9	17	.53
Fashion Shows	3	6	1	8	3	6	9	48	.19
National 4-H Week	4	4	0	8	3	5	8	90	.08
Officer Training	3	3	1	3	1	3	6	89	.07
Ambassadors	2	2	0	4	1	3	4	8	.50
Citizenship Days	4	0	1	3	1	3	4	28	.14
National Congress	1	0	0	1	0	1	2	7	.29
Totals	164	156	38	282	97	223			
% of 320 responses	51.3	49.7	11.8	88.2	30.3	69.7			

Objective 4

4-H members identified by a yes or no response if they were involved in planning, implementing, or evaluating of the top three leadership activities they identified as contributing to leadership life skill development. 4-H members indicated in eight of the leadership activities that their greatest involvement was in implementation (X= 88.2%), followed by evaluation (X=69.7%). The least involvement by members in leadership activities was in the planning phase (X=49.7%) (Table 2).

Table 3
McNemar Tests on 4-H Members's Participation in Planning, Implementing, and Evaluating Their Top 4-H Leadership Activity (n=216)

Contingency table cell	n	X^2	p
Planning by implementing the activity			
Didn't plan or implement	19		
Planned and didn't implement	3		
Implemented and didn't plan	90		
planned and implemented	105	69.4	p,.001
Implemented by evaluating the activity			
Didn't implement or evaluate	8		
Implemented and didn't evaluate	56		
Evaluated and didn't implement	14		
Implemented and evaluated	138	25.2	p<.001
Planning by evaluating the activity			
Didn't plan or evaluate	39		
Planned and didn't evaluate	25		
Evaluated and didn't plan	58		
Planned and evaluated	94	13.1	p<.001

Objective 5

Significantly more (p<.001) 4-H members implemented but did not plan the leadership activity perceived to have made the greatest contribution to life skills development (n=90) than those who planned but did not implement the activity (n=3) (Table 3). Significantly more (p<.001) members implemented but did not evaluate their top leadership activity (n=56) than those who evaluated but did not implement the activity (n=14). Significantly more (p<.001) members evaluated but did not plan their top leadership activity (n=58) than those who planned but did not evaluate the activity (n=25).

Conclusions

1. Twenty-one 4-H leadership development activities were identified. Over 100 4-H members participated in ten leadership activities: fairs, demonstrations, teaching younger members, community service projects, holding office, committee member, livestock shows, project workshops, judging contests, and public speaking. These high numbers indicate that 4-H members are participating in many different leadership activities. Mueller (1989) and Blackwell (1990) found a significant relationship between frequency of participation in 4-H leadership activities and youth leadership skill gain. Participation in 4-H leadership life skills activities was greatest at the club level. This result is similar to Heinsohn and Cantrell (1986) who found in a Pennsylvania study of 4-H members that 92% of the leadership roles occurred at the local club level. However, high participation was also found to exist in several activities at the county/district levels, suggesting that more 4-H members may be participating in a wider range of leadership development activities.
2. Activities identified and ranked as the number one contribution toward leadership life skills development were holding office, teaching younger members, fairs, livestock shows, judging contests, demonstrations, public speaking, and community service. The top three activities contributing toward leadership development remained the same when frequencies from the top three activities were combined. These findings are consistent with Blackwell (1990). These results support the Michigan study (CES, 1976) that states that trial leadership experiences such as holding office and teaching projects and skills to others develop leadership skills.
3. 4-H members indicated their greatest involvement in leadership development activities was in implementing activities (88.2%), followed by evaluating activities (69.7%). Only 49.7% of the respondents indicated involvement in planning leadership

activities. These results are similar to Mueller (1989). Dormody and Seevers (1993) also found similar results for FFA members in Arizona, Colorado, and New Mexico. 4-H youth are doers and not planners or evaluators of leadership activities in which they are involved. One possible explanation for this finding is that adults who work with 4-H programs (4-H leaders, parents, agents, and state faculty) may not be providing youth the opportunity to be involved in the total leadership process (planning, implementing, and evaluating).

Recommendations

1. Seevers and Dormody (in press) found participation in 4-H leadership activities predicted 12.6% of the variance of leadership life skills development among senior 4-H members in Arizona, Colorado and New Mexico. 4-H professionals and volunteer leaders should not only continue to encourage participation in leadership activities at the club/county levels but also provide opportunities and support for involvement at higher levels. Participation in many different leadership activities at a variety of levels promotes personal development as well as the opportunity to work with other youth and adults, set goals and priorities, accept responsibility, and have a greater role in the planning, implementing and evaluating of leadership development activities. Further research should be conducted to determine why specific 4-H leadership activities were chosen by members as the most effective in developing leadership life skills development.
2. Leadership life skills development should be enhanced by greater participation of 4-H members in planning and evaluating 4-H leadership activities. Further research should be conducted to determine the perceptions and attitudes of 4-H members, volunteer leaders, and professional staff regarding member participation in these phases of leadership activities. Staff development and 4-H leader training should be conducted to ensure greater participation and leadership by youth in planning, implementing,

and evaluating program activities. Adults who work with 4-H programs may not be providing youth the opportunity to be involved in the total leadership process (planning, implementing, and evaluating). They may need to be taught to share authority roles and respect youth for the contributions they can make to the leadership process.

3. Mueller (1989) found a significant relationship between leadership life skills development and involvement in planning, implementing and evaluating leadership activities. Experience in implementing leadership activities is a necessary reference from which to draw in planning future activities. A significant number of 4-H youth are involved in implementing leadership activities; however, most are not taking the next steps of reflection, evaluation, and drawing on experience to plan future activities. Further research needs to be conducted to determine why youth are not more highly involved in planning and evaluating leadership activities.

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Critique: **4-H Participation in Leadership Development Activities: A Tri-State Study**, (Seevers & Dormody); **and Participation of FFA Members in Arizona, Colorado and New Mexico in Leadership Development Activities** (Dormody and Seevers).

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Discussed by
Clifford L. Nelson, WSU

For the purposes of this discussion both the Seevers and Dormody as well as the Dormody and Seevers papers will treated as one. It is refreshing to see systematic as well as complimentary and concurrent research studies being conducted.

Both 4-H and FFA purport to develop the leadership capacity of their members who take part in leadership development activities. Many studies have pointed to current success of past active members (Jimmie Carter, past FFA Secretary of Plains, GA FFA and many others). Empirical evidence supporting these assumptions has essentially been lacking. The literature does not show that former members Sally Doe of 4-H or Millie Doe of FFA would not have achieved their adult leadership positions without the skills their youth organization experiences taught. Does the research show that the students would not have taken advantage of Girl Scouts, Camp Fire, student government, FHA, church youth group or some other organization to achieve similar results?

The reviewer firmly believes that the 4-H and FFA have a profound and lasting influence on the development of leadership skills. He is not sure about which questions to ask since post hoc comparisons are the most difficult to justify particularly when the usual subjects of such studies elect enrollment in Agricultural Education classes and 4-H programs. Some doubters might say that those who choose not to enroll may be youth who do not have the capacity or interest to develop leadership skills. Conversely data collected may in fact represent the true relationship between FFA/4H leadership development activities and leadership later demonstrated or perceived by participants.

The authors of the studies develop the need for the study and the need for FFA/4-H leadership development activities very well. The introduction of planning and evaluation data along with historic participation data is an innovative and valuable addition. The purposes and objectives were clearly presented in both papers. Use of complete of state-wide membership rosters of FFA and 4-H members as a population to sample from was very good. Adequate samples were drawn for purposes of the study. Reliability measures were satisfactory as was the Dillman methodology for assuring instrument return. Satisfactory return rates were achieved. The instruments used were based upon Dawn Mueller's work from 1989. The use of an established and previously used instrument contributes to the comparability of the results of these studies to other work already completed.

Use of McNemar's test was appropriate for the type of data collected and comparisons desired. In one comparison in each paper, cell size was a concern. However it did not appear to effect the results or the conclusions that could be drawn and thus one could be confident with the results.

The results, which indicated relative lack of participation of youth in planning and evaluation, are important for youth leaders to ponder. Is the relative youth of 4-H members likely to cause more adult direction of the planning and evaluation process? Is the Program of Activities (POA) of the FFA relevant for all chapters, since the committees and their functions might be perceived as set by others at the national and state levels? Would study of the general population of all youth show lack of planning and evaluation experience in activities other that 4-H and FFA? Would replication of these studies in other regions of the nation show different patterns?

The researchers are commended on conducting well structured and "clean" studies on relevant questions. The results of these studies, and hopefully follow-ups building on these results, could well have significant implications for the 4-H and FFA of the 21st Century.

PARTICIPATION OF FFA MEMBERS IN ARIZONA, COLORADO, AND NEW MEXICO IN LEADERSHIP DEVELOPMENT ACTIVITIES

by
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Introduction and Theoretical Base

The development of "competent and assertive agricultural leadership" is a purpose of the National FFA Organization (1993). Research has provided limited, and often perceptual or correlational, evidence that participation in the FFA develops leadership skills. Brannon, Holley, and Key (1989) found Oklahoma community leaders who had participated in vocational agriculture and FFA in high school felt such participation contributed to their leadership development. They also felt vocational agriculture/FFA participation made the largest contribution to their success as community leaders. Community leaders who participated in vocational agriculture/FFA were more likely than non-participants to be involved in community affairs organizations, school organizations, church groups, agricultural groups, and educational groups as adults. Townsend and Carter (1983) found a positive relationship between FFA participation and leadership development for 12th-grade vocational agriculture students in Iowa, concluding "the leadership trait is enhanced with FFA activity" (p. 21). In Tennessee, a positive relationship between FFA activeness and leadership and personal development was observed by Riketts and Newcomb (1984). They recommended "students should be encouraged to participate in as many (FFA) activities as possible" (p. 58). Dormody and Seevers (1993) reported a positive relationship between participation in FFA leadership activities and leadership life skills development in three southwestern states.

While a relationship between participation in FFA leadership activities and leadership development has been established by these studies, evidence about the nature and effectiveness of member participation in specific FFA leadership development activities is more limited. In Oklahoma, over 50% of the community leaders who had participated in vocational agriculture and FFA (Brannon et al., 1989) had participated in judging contests, fairs and shows, chapter banquets, chapter committees, parliamentary procedure, state convention, and community service. In Iowa, participants in FFA chapter banquets, chapter awards, Chapter Farmer degree programs, chapter office, chapter speech activities, chapter committees, county fair, chapter fund raising, chapter improvement projects, junior office, leadership camps, national convention, proficiency awards, or state convention had higher perceptions of their leadership skills than non-participants (Townsend & Carter, 1983). Participation in local or chapter-level FFA activities has been shown to be related to leadership development (Riketts & Nexcomb, 1984; Townsend & Carter, 1983).

Loftquist (1987) said, "For too long we have seen adolescence as a nonproductive time of life only for becoming and not a time for contributing. We have not asked young people to prepare for what they can do in the future, and we have not respected them for what they can do for themselves and others in the present" (p. 1). Today's leaders must be able to plan, implement, and evaluate programs. To develop these skills, the Program of Activities helps ensure all FFA members are involved in planning, implementing, and evaluating FFA activities. Participating in planning, implementing, and evaluating leadership development activities enables FFA members to do the real work of their chapters and prepare for later life. [illegible] (1992) said, "The new high-performance workplace demands a person [illegible] work productively, think critically and make decisions" (p. 22). Because [illegible] planning, implementing and evaluating phases of leadership development activities parallel the steps in problem solving, FFA members that participate in them work productively, participate in problem solving and decision making, and develop critical thinking skills. Little research has been conducted on the participation of youth in planning, implementing, and evaluating their organization's leadership development activities. In 4-H, Mueller (1989), and Seevers

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and Dormody (in press) found senior 4-H members participated most in the implementation phase of leadership development activities.

Dormody and Seevers (in press) found participation in FFA leadership development activities predicted only 2.3% of the variance in leadership life skills development among FFA members in Arizona, Colorado, and New Mexico. To enable the FFA to improve leadership life skills development programming, more research is needed to determine FFA members' levels of participation in specific leadership development activities; the activities that are the most effective in developing leadership life skills; and FFA members' participation in planning, implementing, and evaluating these activities. Such research is particularly needed in areas with ethnic diversity such as the southwestern United States.

Purpose and Objectives

The purpose of this study was to determine the extent to which 1992-93 FFA members in Arizona, Colorado, and New Mexico participated in FFA leadership development activities. Specific objectives of the study were:

1. To describe FFA members by their years in FFA, age, ethnicity, gender, and place of residence.
2. To describe FFA members by their participation in FFA leadership development activities.
3. To describe FFA members by their perceptions of which FFA leadership development activities have made the greatest contribution to their leadership life skills development.
4. To describe FFA members by their participation in planning, implementing, and evaluating FFA leadership development activities perceived to have made the greatest contribution to leadership life skills development.
5. To determine if there are differences between the frequencies that FFA members participate in the planning, implemention, and evaluation phases of

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FFA leadership development activities perceived to have made the greatest contribution to leadership life skills development.

Procedures

1992-1993 FFA membership rosters were obtained from State Departments of Education in Arizona, Colorado, and New Mexico. From the rosters, the population of FFA members in the three states was calculated to be 9,549. At a 95% confidence level a sample size of 370 was needed to represent the population (Krejcie & Morgan, 1970). This number was rounded to 400 (the confidence level increases slightly to 95.2% with this oversampling). A random sample of FFA members, stratified proportionally by state to ensure representation, was generated.

The study used descriptive survey methodology to measure participation in FFA leadership development activities, perceptions of which FFA leadership development activities have made the greatest contribution to the leadership life skills development, and participation in planning, implementing, and evaluating FFA leadership development activities perceived to have made the greatest contribution to leadership life skills development.

All parts of the instrument and a parallel instrument for 4-H were assessed for content and face validity by a panel of experts consisting of two faculty members in vocational education, two state Cooperative Extension Service administrators, a faculty member in educational administration, and two faculty members in research methods and statistics. Participation in FFA leadership activities was measured by a 25-indicator index adapted from Mueller (1989) utilizing the Official FFA Manual (National FFA Organization, 1993), three state supervisors of agricultural education, and an agricultural education teacher to identify FFA leadership development activities. The index listed FFA leadership activities by various levels of participation ranging from no participation through local, district, state, regional and national participation, depending on the activity. Scores on the participation index can range

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from 0 to 62. Additionally, participants were asked to choose and rank three leadership activities from the participation index they perceived to have helped them the most in developing leadership skills. For each of the three activities identified, they were to indicate whether or not they helped plan, implement, or evaluate the activity. A two-week test-retest procedure with 19 youth who were not part of the sample yielded a reliability coefficient of .97 for the index.

Data were collected from March through June 1993 following the Dillman (1978) procedure for mail questionnaire administration. Incentives were sent with the three mailings to increase response rate. A response rate of 67% (n=266) and a usable response rate of 56% (n=224) were obtained. To check for nonresponse bias, 10 nonrespondents were randomly identified and contacted by telephone. Nonrespondents were compared statistically to respondents by youth leadership life skills development (Seevers & Dormody, in press), years in FFA, age, gender, ethnicity, place of residence, and state. The two groups differed significantly only by ethnicity, with respondents having a higher percentage of minority members than nonrespondents. On the other demographics and youth leadership life skills development, respondents and nonrespondents were similar.

Objectives 1 through 4 were analyzed using descriptive statistics (i.e., frequencies and percentages). Objective 5 was analyzed using McNemar tests for significance of change. A significance level of 0.05 was set a priori for the tests.

Results

Objective 1

The mean number of years the members had been in the FFA was 2.3 (sd=1.3). Members' years in the FFA ranged from one to eight with a mode of one (n=71) and a median of two. The FFA members' ages ranged from 13 to 22 with a mode of 16 (n=64) and a median of 16. Their mean age was 16.3 years (sd=1.5). Of the 224 FFA members, 185 (82.6%) were Anglo, 39 (17.4%) were from a minority group (including 12 Native

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Americans and 25 Hispanics), 129 (57.6%) were male, and 95 (42.4%) were female. Most (51.3% or n=115) came from a farm or ranch. Others said they were from a rural non-farm setting or town under 10,000 in population (29.9% or n=67), a town or city between 10,000 and 50,000 in population (12.9% or n=29), or a suburb or city over 50,000 in population (5.8% or n=13).

Objective 2

Over half the FFA members participated in eight of the 25 leadership development activities listed in the questionnaire. Chapter meetings had the highest frequency of participants (n=210) followed by participation in fundraising activities (n=191), chapter banquet (n=184), judging contests (n=178), committees (n=141), parliamentary procedure (n=133), public relations (n=125), and SAEP (n=119). Other activities with relatively high participation were Achievement Award Program (n=108), public speaking (n=106), state convention (n=103), and holding office (n=101) (Table 1).

Only 23% (n=51) of the FFA members had participated in Program of Activities (POA) planning. For activities that were offered at and above the chapter level, participants did not advance beyond the chapter level 66% of the time. Of the 178 FFA members who participated in judging contests, 157 (88%) participated beyond the chapter level and 121 (68%) participated at the state level (Table 1).

Objective 3

FFA members were asked to identify the three FFA leadership development activities they felt made the greatest contribution to their leadership life skills development. Judging contests (n=110), public speaking (n=67), chapter meetings (n=62), holding office (n=55), and parliamentary procedure (n=54) had the top five frequencies (Table 2). Only four members had POA planning in their top three leadership development activities. To obtain a more standardized measure of the perceived leadership development value of the activities, the frequency each activity

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was identified in the top three was divided by the overall participation frequency in the activity. The five highest ratios obtained were for the Washington Conference Program (.67), public speaking (.63), judging contests (.62), holding office (.54), and National FFA Convention (.49). Only 24% of the members with a SAEP considered it a top leadership development activity (Table 2).

Table 1
Highest Level of FFA Members' Participation in Leadership Development Activities (n=220)

Activity	None	Local	Distr.	State	Region	Nation	Total Part.
Chapter meetings	10	210	-*	-	-	-	210
Fundraising	29	191	-	-	-	-	191
Chapter banquet	36	184	-	-	-	-	184
Judging contests	42	21	27	112	7	11	178
Committee member	79	126	7	6	0	2	141
Parliamentary procedure	87	75	36	22	-	0	133
Public relations	95	125	-	-	-	-	125
SAEP	101	119	-	-	-	-	119
Achievement Award Program	112	108	-	-	-	-	108
Public speaking	114	54	35	17	0	0	106
State convention	117	-	-	103	-	-	103
Holding office	119	85	21	2	-	0	101
Officer training	127	71	-	18	2	2	93
Proficiency Award Program	128	65	-	21	4	2	92
Food for America	136	84	-	-	-	-	84
Achievement in Volunteerism	144	74	-	2	-	0	76
BOAC	146	60	-	10	-	4	74
National Convention	163	-	-	-	-	57	57
Computers in Agriculture	165	54	0	0	-	1	55
POA planning	169	51	-	-	-	-	51
National Safety Award Program	174	30	-	14	-	2	46
Made for Excellence Program	186	-	-	34	-	-	34
Agriscience Recognition Program	188	30	1	1	0	0	32
Summer leadership camp	199	-	-	21	-	-	21
Washington Conference Program	217	-	-	-	-	3	3

*A dash (-) indicates the activity was not offered at that level.

Objective 4

Overall, 48.2%, 84.8%, and 67.1% of the FFA members said they participated in planning, implementing, and evaluating the three FFA leadership development activities they felt made the greatest contribution to their leadership life skills

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development, respectively (Table 2). For the 12 activities cited by more than 20 members, over 50% of the members participated in planning public speaking, SAEP, committee, and officer activities. For the 12 activities cited by more than 20 members, over 50% of the members participated in implementing and evaluating all except the chapter banquet.

Table 2
FFA Members' Participation in Planning, Implementing, and Evaluating Their Top Three Leadership Development Activities (n=220)

	Planning		Implement.		Evaluating		Total	Total	
Activity	No	Yes	No	Yes	No	Yes	Top 3	Part.	Ratio
Judging contests	61	49	13	97	38	72	110	178	.62
Public speaking	27	40	3	64	20	47	67	106	.63
Chapter meetings	34	28	14	48	28	34	62	210	.30
Holding office	16	39	0	55	19	36	55	101	.54
Parliamentary proc.	28	26	7	47	12	42	54	133	.41
Fundraising	22	18	1	39	13	27	40	191	.20
State convention	26	7	15	18	9	24	33	103	.32
SAEP	4	25	0	29	2	27	29	119	.24
National Convention	23	5	14	14	8	20	28	57	.49
Committee member	10	17	4	23	12	15	27	141	.19
Officer training	19	5	5	19	8	16	24	93	.26
Chapter banquet	15	6	11	10	15	6	21	184	.11
Public relations	9	11	1	19	5	15	20	125	.16
Achievement in Volun.	10	5	1	14	4	11	15	76	.20
Proficiency Award Pro.	4	10	1	13	3	11	14	92	.15
Made for Excellence Pro.	8	3	2	9	1	10	11	34	.32
BOAC	4	5	1	8	3	6	9	64	.14
Food for America	3	5	1	7	2	6	8	84	.10
Summer leadership camp	7	1	2	6	2	6	8	21	.38
Agriscience Recog. Pro.	4	3	3	4	4	3	7	32	.22
Computers in Agric.	3	3	0	6	2	4	6	55	.11
Achievement Award Pro.	2	2	0	4	4	0	4	108	.04
POA planning	0	4	0	4	1	3	4	51	.08
Washington Conf. Pro.	2	0	0	2	1	1	2	3	.67
National Safety Aw. Pro.	1	0	0	1	0	1	1	46	.02
Totals	342	318	100	560	217	443			
% of 660 responses	51.8	48.2	15.2	84.8	32.9	67.1			

Objective 5

Significantly more (p<.001) FFA members implemented but did not plan the leadership activity perceived to have made the greatest contribution to leadership life skills development (n=90) than those who planned but did not implement the activity (n=3) (Table 3). Significantly more (p<.001) members implemented but did not evaluate their top leadership activity (n=58) than those who evaluated but did not implement the activity (n=15). Significantly more (p<.001) members evaluated but did not plan their top leadership activity (n=71) than those who planned but did not evaluate the activity (n=27).

Table 3
McNemar Tests on FFA Members' Participation in Planning, Implementing, and Evaluating Their Top FFA Leadership Activity (n=223)

Contingency table cell	n	X^2	p
Planning by implementing the activity			
Didn't plan or implement	25		
Planned and didn't implement	3		
Implemented and didn't plan	90		
Planned and implemented	105	81.4	p<.001
Implementing by evaluating the activity			
Didn't implement or evaluate	13		
Implemented and didn't evaluate	58		
Evaluated and didn't implement	15		
Implemented and evaluated	137	25.3	p<.001
Planning by evaluating the activity			
Didn't plan or evaluate	44		
Planned and didn't evaluate	27		
Evaluated and didn't plan	71		
Planned and evaluated	81	19.8	p<.001

Conclusions

1. Over 100 FFA members participated in 12 leadership development activities: chapter meetings, fundraising, chapter banquet, judging contests, committees, parliamentary procedure, public relations, SAEP, Achievement Award Program, public speaking, state convention, and holding office. This list matches the list obtained by Brannon et al. (1989) in six of seven activities [judging contests, fairs and shows (overlaps with SAEP), chapter banquet, committees, parliamentary procedure, and state convention]. The fact that Brannon et al. (1989) researched adult community leaders with vocational agriculture/FFA backgrounds suggests that

present-day FFA members may be participating in a wider variety of leadership development activities.

Most FFA members do not proceed beyond the chapter level for leadership development activities offered at and above the chapter level, except for judging contests. Judging contests are successfully providing many FFA members with an opportunity to travel outside of the home community.

One of the goals of the chapter Program of Activities (POA) is to achieve "total chapter participation" (National FFA Organization, 1993, p. 17) of the members. With only 23% of the members stating they participated in POA planning, a question is raised about how many agricultural education teachers are encouraging FFA members to plan, implement, and evaluate a POA. The large number of members participating in committees suggests many chapters are using committees for chapter operations. What committees are the chapters using? Are the 12 standing committees suggested by the National FFA Organization (1993) being adopted as an operational framework for the chapter?

2. According to the FFA members, judging contests, public speaking, chapter meetings, holding office, and parliamentary procedure were often cited as activities that had made the greatest contribution to their leadership life skills development. The Washington Conference Program, public speaking, judging contests, holding office, and National FFA Convention were cited by high percentages of participants as activities that had made the greatest contributions to their leadership life skills development. These lists are much smaller than the list of 14 FFA activities related to leadership development found by Townsend and Carter (1983). Small numbers of members cited POA planning and SAEP, two activities considered by agricultural educators to be integral to strong programs, as top leadership development activities.

3. By almost a 2:1 ratio, FFA members are implementing more than planning leadership development activities. Members are also implementing more than

evaluating, and evaluating more than planning activities. These results are similar to those found by Mueller (1989), and Seevers and Dormody (in press) for 4-H.

Recommendations

1. Dormody and Seevers (in press) found participation in FFA leadership development activities predicted only 2.3% of the variance in leadership life skills development among FFA members in Arizona, Colorado, and New Mexico. With the variety of leadership development activities available through FFA, agricultural education teacher educators, teachers, and state supervisors in the three states should work together to expand opportunities for FFA members to develop leadership skills. When a chapter adopts a wide variety of activities, it embraces a more individualized approach to leadership development. FFA members should be encouraged and at least partially funded to participate in activities above the chapter level. Further research should be conducted to determine the effectiveness of each FFA activity in developing leadership life skills development.

2. If agricultural educators in the three states believe that "those who fail to plan, plan to fail," then they must be concerned about the lack of FFA member participation in planning the chapter Program of Activities (POA). Further research should be conducted to determine the extent to which FFA chapters are planning, implementing, and evaluating a POA. Are the chapters using a POA more efficient and effective at developing leadership skills? Preservice and inservice education should be strengthened to ensure a high percentage of agricultural education teachers require FFA members to plan, implement, and evaluate a POA.

3. Agricultural educators in the three states should also be concerned with the relatively low participation of FFA members in planning and evaluating leadership development activities. Agricultural education teachers must allow members to plan and evaluate these activities as much as possible. Tomorrow's agricultural leaders must be able to plan and evaluate as well as conduct programs. They must also be able

to solve problems. Agricultural educators should be concerned about avoiding creating a generation of doers who aren't thinkers.

4. More research is needed to determine why only half of the members had a SAEP and few recognized it as a top leadership development activity. How much emphasis is being placed on SAEP in the three states? Is the leadership development potential of SAEP being recognized, tapped, and reinforced by agricultural educators?

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Critique: **4-H Participation in Leadership Development Activities: A Tri-State Study**, (Seevers & Dormody); and **Participation of FFA Members in Arizona, Colorado and New Mexico in Leadership Development Activities** (Dormody and Seevers).

Discussed by
Clifford L. Nelson, WSU

For the purposes of this discussion both the Seevers and Dormody as well as the Dormody and Seevers papers will treated as one. It is refreshing to see systematic as well as complimentary and concurrent research studies being conducted.

Both 4-H and FFA purport to develop the leadership capacity of their members who take part in leadership development activities. Many studies have pointed to current success of past active members (Jimmie Carter, past FFA Secretary of Plains, GA FFA and many others). Empirical evidence supporting these assumptions has essentially been lacking. The literature does not show that former members Sally Doe of 4-H or Millie Doe of FFA would not have achieved their adult leadership positions without the skills their youth organization experiences taught. Does the research show that the students would not have taken advantage of Girl Scouts, Camp Fire, student government, FHA, church youth group or some other organization to achieve similar results?

The reviewer firmly believes that the 4-H and FFA have a profound and lasting influence on the development of leadership skills. He is not sure about which questions to ask since post hoc comparisons are the most difficult to justify particularly when the usual subjects of such studies elect enrollment in Agricultural Education classes and 4-H programs. Some doubters might say that those who choose not to enroll may be youth who do not have the capacity or interest to develop leadership skills. Conversely data collected may in fact represent the true relationship between FFA/4H leadership development activities and leadership later demonstrated or perceived by participants.

The authors of the studies develop the need for the study and the need for FFA/4-H leadership development activities very well. The introduction of planning and evaluation data along with historic participation data is an innovative and valuable addition. The purposes and objectives were clearly presented in both papers. Use of complete of state-wide membership rosters of FFA and 4-H members as a population to sample from was very good. Adequate samples were drawn for purposes of the study. Reliability measures were satisfactory as was the Dillman methodology for assuring instrument return. Satisfactory return rates were achieved. The instruments used were based upon Dawn Mueller's work from 1989. The use of an established and previously used instrument contributes to the comparability of the results of these studies to other work already completed.

Use of McNemar's test was appropriate for the type of data collected and comparisons desired. In one comparison in each paper, cell size was a concern. However it did not appear to effect the results or the conclusions that could be drawn and thus one could be confident with the results.

The results, which indicated relative lack of participation of youth in planning and evaluation, are important for youth leaders to ponder. Is the relative youth of 4-H members likely to cause more adult direction of the planning and evaluation process? Is the Program of Activities (POA) of the FFA relevant for all chapters, since the committees and their functions might be perceived as set by others at the national and state levels? Would study of the general population of all youth show lack of planning and evaluation experience in activities other that 4-H and FFA? Would replication of these studies in other regions of the nation show different patterns?

The researchers are commended on conducting well structured and "clean" studies on relevant questions. The results of these studies, and hopefully follow-ups building on these results, could well have significant implications for the 4-H and FFA of the 21st Century.

ADMINISTRATIVE APPROACHES TO THE MANAGEMENT OF CONCURRENT ENROLLMENT PROGRAMS

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Introduction

Voorheis (1979) reported that many high school seniors who complete most of their high school requirements by the end of their junior year or after the first semester of their senior year often face an "intellectual slack time." The final years of high school can include unchallenging courses. An alternative would be to offer college-level courses, which would challenge high school students intellectually and expose them to the college environment and a higher educational curriculum. Such a concurrent enrollment program (CEP) allows upper division high school students to take college-level courses prior to graduation and simultaneously receive credit toward high school graduation and college (Greenberg, 1989).

According to Greenberg (1989), concurrent enrollment programs provide numerous and substantial benefits to students, parents, high schools, post-secondary institutions, and society as a whole. Students may earn college credits at reduced tuition, experience an increased desire to learn, and experience less senior-year boredom, commonly known as, "senioritis." The program also lets parents assess their children's aptitudes for college-level work. Communication between high schools and colleges is facilitated while high school teachers feel it enhances their status and image in the community. Furthermore, concurrent enrollment helps participating colleges recruit motivated students, create grant opportunities, increase interactions between high school and college faculty, and improve community relations.

In 1967, Utah State University initiated a concurrent enrollment program with major centers in Ogden (50 miles from campus) and the Uintah Basin (260 miles from campus) in an attempt to overcome the problems of intellectual slack time during the high school senior year and declining enrollment at the university. Utah State University administrators view the program as a success. In 1987, the Utah State University College of Agriculture introduced three 100-level agricultural science courses in a concurrent enrollment program statewide.

In the Utah State University concurrent enrollment program, there are three levels of administrative management, each of which corresponds to an education center: Ogden Center (Level One), College of Agriculture (Level Two), and the Uintah Basin Center (Level Three).

In Level One, known as least control, high school teachers teach concurrent enrollment program courses, prepare exams, and grade papers. In Level Two, known as intermediate control, high school teachers teach concurrent enrollment program courses, while Utah State University faculty prepare exams and grade papers. In Level Three, known as most control, Utah State University extension faculty teach concurrent enrollment program courses, prepare exams, and grade papers (Table 1).

Table 1
Types of Administration

Least Control at Ogden Center	Intermediate Control at College of Agriculture Center	Most Control at Uintah Basin Center
High school teachers teach CEP course.	High school teachers teach CEP course.	USU extension faculty teach CEP course.
High school teachers prepare/deliver exams.	USU faculty prepare tests and grade papers.	Extension faculty prepare and grade papers.

Although Utah State University's concurrent enrollment program has existed for 25 years and is perceived to be beneficial, its impact on the participants' achievements (GPA), recruitment, and retention have not been systematically assessed. Therefore, we compared the three major administrative approaches to determine which approach has the greatest impact on participants' GPAs, recruitment, and retention.

Purposes and Objectives

We utilized data from 1987 to 1991 to answer the following four questions:

1. Do the three different administrative levels have different GPAs for comparable general education courses or selected major courses of participants?

2. Are any of the different administrative levels more effective recruiting high school students to the Utah State University campus?

3. Do any of the three administrative levels change rate of retention one year after participants joined Utah State University?

4. Do any of the different administrative levels increase GPA and/or retention when compared with other freshmen?

Theoretical/Literature Base

According to Dillon (1986), the concurrent enrollment program originated from the concept of advanced placement. Greenberg (1989) named recognized concurrent enrollment programs in the United States, each with different capabilities, program designs, student populations, strengths, and limitations. Each program lets participating students receive credit toward high school graduation and college, although it may not be always possible to transfer those credits to other colleges or universities.

There is often curriculum redundancy or duplication and an overlap of content during the last two years of high school and the first two years of college. Such duplication may be necessary for students who are deficient in the basic skills, but not for academically advanced students. Blanchard (1971) concluded that nearly one-third of the subject matter during the first two years of college merely repeated what had been taught in high school and estimated that this duplication cost was $420 million in 1965.

The high school curriculum and the changing demographics of the college population determine whether introductory college-level courses are appropriate (Greenberg, 1989). Many young students are physically, socially, and intellectually more advanced today than their parents were at the same age, which led the Regents of the University of the State of New York (1974) to reappraise many of the introductory college-level courses.

The G.I. Bill after World War II encouraged colleges to admit students that were more representative of the nation's high school graduates. In 1985, more than one million high school graduates entered some kind of post-secondary institution (Boyer, 1987). Concurrent enrollment programs must recognize this trend and admit students at various achievement levels. Concurrent enrollment programs build bridges between high schools and colleges (Parnell, 1985).

Watkins (1979) and Borchardt (1989) indicated that study skill was the major factor predicting academic success in college. Hence, one may infer that students' achievement (GPA) in concurrent enrollment programs reflects their study habits.

The Utah State University College of Agriculture initiated a concurrent enrollment program to reverse declining enrollment in agriculture. Undergraduate enrollment in colleges of agriculture declined by 18%, between 1981 and 1984 (Robbins, 1985), which has emphasized the importance of student recruitment (Frost, 1987). Providing information about financial assistance, tuition waivers, academic calendar, and admission policies are the most important prerequisites of successful recruitment strategy (Kolatai, 1985).

Methods and Procedures

We determined whether achievement, recruitment, and retention (the dependent variables) were influenced by the three administrative approaches used to administer the concurrent enrollment programs. The data were acquired from Utah State University's computerized student records.

We used systematic sampling techniques to select samples from the target populations. In the "least control" approach, the target population was 3,170 participants and the sample size was 793. In the "intermediate control" approach, the target population was 515 and the sample size was 130. In the "most control" approach, the target population was 4,997 while the sample size was 1,250. Sample size was based on Cohen's (1977) sample size formula, stated as follows:

$$n = N.05/400f^2 + 1$$

Where N is the necessary target population for the given a, u, and desired power at $\alpha=0.05$, f is the nontabled effect size (ES) rounded to the nearest integer and/or the effect size; a is the significance criteria; μ is the number of degrees of freedom; and n is the sample size. Four hundred (400) is a constant from Cohen's formula. Assumptions were made:

$$A = 0.05 \quad \mu = k-1 \quad k = 3 \quad \mu = 2 \quad f = 1 \text{ and power} = .95.$$

The data were placed on a computer diskette and analyzed using SPSS/PC. For ANOVA comparisons, the most conservative test of Scheffe was used to test statistical significance.

Results

Of the total participants in this study, 36.5% were from the Ogden Center (the lowest level of administrative control), 6% were from the College of Agriculture (the intermediate level of control), and 57.5% were from the Uintah Basin Center (the highest level of administrative control). The numbers and percentages of students included under each level of administrative control are indicated in Table 2 and the number of students included in the study each year are displayed in Table 3.

Table 2
Number and Percentage of Students in Each Type of Administration

Types of Administration	Number	Percentage
Lowest (Ogden Center)	793	36.5
Intermediate (College of Agriculture)	130	6.0
Highest (Uintah Center)	1,250	57.5
Total	2,173	100.0

Table 3
Number and Percentage of CEP Students Enrolled in Each School Year, 1988 to 1991

Year	Number	Percentage
1988	767	35.3
1989	495	22.8
1990	666	30.6
1991	245	11.3
Total	2,173	100.0

Concurrent enrollment students were juniors and seniors. The ages of program participants varied from 16 years to 20 years old. The concurrent enrollment participants attended eight colleges at Utah State University. Most majored in engineering, while a few students majored in the natural sciences.

As shown in Table 4, those students who enrolled in concurrent enrollment programs with the least administrative control had significantly ($p < 0.05$) higher GPAs (CEPGPA) than students enrolled in the programs that were administered differently.

Table 4
One-way Analysis of Variance for CEPGPA by Type of Administration

Source	df	SS	Ms	*F* ratio	Significance
Between groups	2	78.7422	39.369	63.8680*	* p < .05
Within groups	2170	1338.5350	.6168		
Total	2172	1417.3272			

Group	Count	Mean	Std.Dev.	Std.Err.	95% C.I for mean
1	793	3.30	.73	.26	3.25 to 3.35
2	130	2.90	.75	.66	2.74 to 3.06
3	1250	2.90	.82	.02	2.87 to 2.93
Total	2173	3.10	.81	.02	3.02 to 3.18

Group	GRP2	GRP3	GRP1
Group	G	G	G
2			
3			
1	*	*	
Effect Size			
Least Control	1.46		
Intermediate Control	0.49		
Most Control	0.57		

Table 5 indicates that 40.3% of students who completed concurrent enrollment programs enrolled at Utah State University. A significantly higher ($p < 0.05$) proportion of students who were enrolled in concurrent enrollment programs that were most intensively administered enrolled at Utah State University (Table 6).

Table 5
Number and Percentage of CEP Participants Enrolled at USU

Recruitment Status	Frequency	Percent
Enrolled at USU-Logan	875	40.3
Did not enroll at USU-Logan	1,298	59.7
Total	2,173	100.0

Table 6
Chi-square Analysis of CEP Recruitment Related to Types of Administration at USU

Least Control		Intermediate Control		Most Control	
Enrolled	46.2%	Enrolled	33.8%	Enrolled	40.3%
Not Enrolled	53.8%	Not Enrolled	66.2%	Not Enrolled	59.3%
Total	793	130		1,250	2,173
	36.5%	6.0%		57.5%	100.0%

Chi-square = 14.55326
$df = 2 \quad p < .01$

Students who attended Utah State University tended to remain at the University (Tables 7 and 8). Of the 875 students recruited, 869 (99.3%) were retained. Retention rates did not differ by the type of administration used in concurrent enrollment programs.

Table 7
Number and Percentage of CEP Students Retained at USU After One Year

Retention Status	Frequency	Percent
Retained at USU one year after completing CEP course	869	99.3
Not retained at USU one year after completing CEP course	6	0.7
Total	875	100.0

Table 8
Chi-square Analysis of CEP Retention Related to Types of Administration as Compared to USU Freshmen Retention

Least Control	Intermediate Control	Most Control	Row Total
99.7%	97.7%	99.2%	869

Chi-square = 14.55
df = 2 $p < .01$

Moreover, the GPA of freshmen who had been enrolled in concurrent enrollment programs was significantly higher ($p < 0.05$) than freshmen who had not participated in the program (Table 9). Participation also significantly improved ($p < 0.05$) retention rates (Table 10).

Table 9
Comparison of CEP and GPA With USU Freshmen GPA

Types of Administration	$\bar{X}$ Mean	*t*-value
Least Control	3.30	8.6000*
Intermediate Control	2.90	5.9922*
Most Control	2.90	11.7793*
USU	2.65	

*$p < .05$

Table 10
Comparison of CEP Retention with USU Freshmen Retention

Types of Administration	$\bar{X}$ mean	*z*-value
Least Control	99.7	16.6852*
Intermediate Control	97.7	5.6087*
Most Control	99.2	19.3479*
USU	55.2	

*$p < .05$

Conclusions

1. The manner in which the concurrent enrollment programs were administered influenced the GPA of students while they were enrolled in high school (GPAs were significantly higher with the least amount of administrative control). After attending college for one year, the GPA of students who had attended concurrent enrollment programs administered by high school teachers was higher than those who attended programs administered by University extension faculty.

2. The type of administration also affected the rate of college attendance which was significantly higher among students enrolled in programs that were administered by high school teachers.

3. The type of administration did not affect the retention rate of participants but, compared to freshmen who had not participated in a concurrent enrollment program, it was significantly higher.

4. Participation in concurrent enrollment programs apparently helped students succeed in college, as indicated by the fact that the GPAs of freshmen who had participated were significantly higher than the GPAs of freshmen who had not participated in such a program one year after enrolling at USU.

Educational Implications

This study confirms the philosophy of administrative leaders in agricultural education at Utah State University. The most effective manner to offer concurrent credit courses is through high school instructors. Therefore, secondary-level agricultural education teachers should be used in offering agriculturally related college/university courses in the high schools.

In the past, Utah State University educational leaders perceived the concurrent enrollment program as a recruitment tool. The findings of this study agrees with the above perception. Therefore, Utah State University administrators should continue the concurrent enrollment program with the emphasis of encouraging more high school teachers to participate in teaching of the concurrent enrollment program courses.

This study was limited to the first year in college. Therefore, a follow-up study of concurrent enrollment program students up to the completion of a degree program might help to understand more about the impacts of the program on student achievement, recruitment, and retention.

An economic model related to the cost effectiveness of the concurrent enrollment program should be developed with a focus on full-time faculty employees versus high school teachers.

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Critique: **Administrative Approaches to the Management of Concurrent Enrollment Programs** (Hirpa and Straquadine).

Discussed by
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New patterns of delivery of college level instruction must be developed if the nation is to serve the "place-bound," the financially limited and the focused and motivated citizen who might profit from university study. This is particularly true of public institutions who receive significant funding from the taxes of all state citizens regardless of home location. Utah State University is to be commended for taking the lead in extending college level instruction to secondary students statewide. The institutions is also to be commended for the trial of three different levels of course administration. Other institutions with similar goals of outreach can profit from these experiences.

The research exemplifies utilization of existing data bases to do post hoc comparisons of 3 different course administrative patterns on retention, GPA and recruitment. These are important concerns for the university administration and programs such as Agricultural Education which seeks additional enrollment to meet demand for graduates.

The objectives, populations under study and methodology of sampling were clearly stated and appeared appropriate. The numbers sampled were of sufficient magnitude to give confidence in the results of the study. The analysis of the data appeared appropriate for the objectives stated and type of information collected.

A question of interest, that did not appear to be addressed, was whether or not teachers of students (Level I or least controlled) might have selected better students to participate than might be found in the other types of administration. It is apparent that motivation for university study might also account for some of the original enrollment in the college level courses as well as partially explaining the relatively high retention levels for CEP students who successfully completed course work.

The additional study of cost effectiveness and longitudinal follow-up of former participants that was recommended by the researchers will add significantly to the implications of the concurrent enrollment efforts. It is expected that other land grant institutions will closely watch for the results of this research as they consider similar out reach activities. The researchers are to be commended for addressing professionally relevant questions with a well developed inquiry.

AN ANALYSIS OF THE LEADERSHIP STYLES OF SELECTED FFA MEMBERS AND THEIR ADVISORS

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AN ANALYSIS OF THE LEADERSHIP STYLES OF SELECTED FFA MEMBERS AND THEIR ADVISORS

The development of leadership skills in secondary agriculture science programs traditionally has occupied an integral part of the curriculum through FFA activities. Each year hundreds of FFA members participate in leadership conferences and other activities designed to foster and build effective leaders. Herren (1989) stated that agricultural educators always have believed leadership to be a trait that can be taught successfully. Teaching leadership skills to a diverse student population, however, may occur as often through role modeling and example as it does in a controlled environment designed to "teach" leadership.

Gartin (1991) contended that students need to be aware of their leadership types and leadership styles in order to understand themselves and their peers more fully. "When a student recognizes his/her own leadership style, and the strengths and weaknesses of it, he/she can better appreciate the styles of others." He continued by stating that people who understand the importance of having individuals in an organization with differing leadership traits are the same people that help groups become more efficient, effective, and productive (p.4).

Questions arise as to the development and adoption of leadership styles by students. How much does the role of the teacher influence the leadership style of the student? Does a teacher's leadership style differ significantly from the student's developing style? What are the predominate leadership styles of students enrolled in the FFA? Are the leadership styles of identified FFA leaders different from other students identified as non-FFA members.

Purpose and Objectives

This study sought to determine if significant differences existed in the leadership styles of selected FFA members, their advisors, and other students identified as non-FFA members.

Specific objectives included the following:

To determine the leadership style of selected FFA members as indicated by My BEST Leadership Style (MBLS) instrument.

To determine the leadership style of selected agriculture science teachers as indicated by My BEST Leadership Style instrument.

To determine if differences existed in leadership styles of selected FFA leaders and their respective teachers as measured by My BEST Leadership Style instrument.

To determine if a difference existed in leadership styles between selected FFA leaders in secondary schools and other selected students identified as non-FFA members.

To identify demographic data which may be related to specific leadership styles.

Methods and Procedures

The design of this study employed survey research as described by Babbie (1989). Specifically, the study utilized a self-reported questionnaire to determine the leadership styles of three groups. First, students and teachers from two FFA area leadership conferences participated in the study by completing a survey to determine their leadership styles. Secondly, agricultural science students participating in two district leadership conferences completed the survey. Finally, non-agricultural science students from intact English classes responded to the survey.

Population Identification

The population of this study consisted of secondary students enrolled in public high schools in two selected FFA areas and two FFA districts. The study used a purposive sampling technique (Babbie, 1989) since it attempted primarily to examine the leadership styles of identified student leaders in the FFA and their teachers. The purposive sample consisted of all chapter, district, area and state FFA officers selected to participate in two area FFA leadership conferences (68 students and their teachers). Two hundred and one FFA members attending the two district leadership workshops also completed the survey. Identified FFA leaders included those participants indicating current or previous officer positions The sample size for the FFA leaders totaled 269 which included 201 district and 68 area participants.

Non-agriculture students in intact academic classes from three public schools in the two FFA areas participated in the study. These students, from eleventh and twelfth grade English classes, indicated if they currently or previously had held an elected office in a school club or organization. Students classified as non-FFA members/non leaders reported never holding an office. This procedure yielded seventy-seven non-FFA members.

Instrumentation

The My BEST Leadership Style (MBLS) instrument determined the leadership style/personality type of each participant in the study. The MBLS instrument, developed by Brewer (1989), fulfills the need for a measuring instrument that is (a) easily understood, (b) easily administered, (c) administered in a short time frame, (d) used in conjunction with ongoing training or development activities, (e) easily scored, and (f) administered without special training.

The MBLS identifies four personality or leadership types including (a) bold, (b) expressive, (c) sympathetic, and (d) technical. The research findings of a number of noted researchers including Marston (1979) and Gorovitz (1982) identified these leadership or personality types.

Alpha coefficient reliabilities for the four sub-categories of the instrument included .92 for bold, .89 for expressive, .86 for sympathetic, and .97 for technical.

Procedures

In the summer of 1992, 68 FFA members and their respective agriculture science teachers completed a questionnaire to determine their leadership styles. Mailed questionnaires surveyed agriculture science teachers not attending the leadership conference. Follow-up phone calls insured all surveys were returned and yielded a one-hundred percent return rate.

In the fall, a purposive sample of 201 agricultural science students not participating in the two leadership conferences completed the survey. These students responded during two district leadership workshops. Also, a purposive sample of 77 non-agriculture students from intact English classes responded to determine their leadership styles. Classification of these students as non-FFA/non leaders depended on whether or not they currently or previously had held an office.

Results and Conclusions

Inferential statistics analyzed the data from 68 selected FFA leaders and their respective teachers that attended the two leadership conferences. A one-way multivariate analysis of variance (MANOVA) blocked over cases (student-teacher pairs) determined whether there was a difference between students and their respective teachers on the multivariate response variable leadership style variates: A=Bold, B=Expressive, C=Sympathetic and, D=Technical. Canonical discriminate analysis established which combination of variates, if any, is most important for discriminating between students and their respective teachers. Responses on the MBLS instrument from 269 selected leaders and 77 student non-leaders comprised a data file. A three-way multivariate analysis of covariance (2x2x2 MANCOVA) using grade point average (GPA) as the covariate examined the effects of role (leader, non-leader), gender (male, female), or location (rural, urban) on the multivariate response variable leadership style (variates: A, B, C, D). All analyses used SAS (SAS Institute Inc., 1989). Missing values were excluded.

Objective One

Objective one addressed the leadership style of selected FFA members as indicated by My Best Leadership Style instrument. A raw score of 15 in any single category indicated a leadership style dominated by that category. Raw scores under 15 indicated that the individual was eclectic in nature, utilizing more than one category to mold their leadership style.

Results showed that seven individuals were predominantly bold, 23 individuals were predominantly expressive, zero individuals were predominantly sympathetic, and one individual was predominantly technical. The remaining 37 individuals did not indicate a dominant leadership style and thus were eclectic in nature, showing characteristics of all leadership styles. This finding, supported by Bolton and Bolton (1984) considers that no person conforms completely to one leadership type, but most persons have a predominate style, eclecticism being one of those styles. It should be noted that Bolton's use of the word predominate and the BEST instrument's classification of predominate (15 or greater in any area) may not have exactly the same meaning.

Objective Two

Objective two addressed the leadership style of selected agriculture science teachers as indicated by My BEST Leadership Style instrument. As before, a score of 15 or greater indicated an individual dominated in a specific leadership style. Results indicated that five teachers were predominantly bold, eight teachers were predominantly expressive, three teachers were predominantly sympathetic, and four teachers were predominantly technical. The remaining 24 individuals did not indicate a dominant style and thus were eclectic in nature, showing characteristics of all leadership styles. Some teachers had more than one student participating.

Objective Three

Objective three addressed differences existing in leadership styles of selected FFA leaders and their teachers as measured by the MBLS instrument. Sixty-eight FFA leaders and their teachers (44) completed the survey during two area leadership conferences.

The MANOVA procedure test statistic Wilks' lambda=0.7119 indicated an overall significant (p=.0002) difference between students and their respective teachers in leadership style as measured by the MBLS. The follow-up canonical discriminant analysis performed after the significant difference was obtained yielded the following correlations between the MBLS sub-scales: 0.3655 (A), 0.5735 (B), -0.2289 (C), and -0.9847 (D). Examination of the coefficients revealed only variates B (expressive) and D (technical) contributed meaningfully, although in a contrasting manner, to discrimination between students and their respective teachers relative to leadership style. Univariate analyses indicated that for variate B, the mean (m_{BS}=12.09) of the students was significantly (p=.0038) higher than the mean (m_{Bt}=9.60) of the respective teachers; and for variate D, the mean (m_{DS}=4.93) of the students was significantly (p=.0001) lower than the mean (m_{Dt}=8.12) of their respective teachers. Table 1 contains the means and standard deviations for the responses on the MBLS for the students and teachers for each of the sub-scales. Students, then, indicated a more expressive but less technical leadership style than their teachers.

Objective Four

Objective four determined if a difference existed in leadership styles between selected FFA leaders and selected secondary school students identified as non-FFA members/non leaders. Data collected from 269 selected FFA leaders and from 77 non-FFA members indicated that 24 leaders were predominantly bold, 51 were predominantly expressive, one was predominantly sympathetic, and five were predominantly technical. The remaining 188 individuals were eclectic in style. It should be noted that scores approaching dominance in a category, when statistically compared to other scores may indicate a significant difference even though few scores actually reached the dominance score of 15 or greater as designated by the MBLS.

Results from non-FFA members revealed that 10 non-members were predominantly bold, 10 were expressive, two were sympathetic and zero were technical. The MANCOVA procedure statistic Wilks' lambda found no significant differences between FFA leaders and non-members.

Objective Five

Objective five addressed the identification of demographic data which may be related to specific leadership styles. Selected FFA leaders from the two area leadership conferences, two district FFA meetings, and from students in three public high schools provided the data. Analysis examined each category of the MBLS leadership instrument for differences by gender (male or female) and by location (rural or urban). The MANCOVA procedure test statistic Wilks' lambda found an overall significant ($p =< .05$) gender difference in leadership style. The follow-up canonical discriminant analysis performed after the significant difference was obtained yielded the following correlations between the MBLS subscales and the first discriminate function: -0.0256 (A), 0.5657 (B), -0.1022 (C), and -0.7947 (D). Examination of the coefficients revealed only variates B (expressive) and D (technical) contributed meaningfully, although in a contrasting manner, to discrimination between males and females relative to leadership style.

Table 1

Adjusted Student and Teacher Leadership Style Means,
Standard Deviations, and p-Values for
Univariate Analysis

Leadership Style	Student (n=68)		Teacher (n=68)**		
	mean	sd	mean	sd	p-value
Bold	8.69	4.64	7.47	4.87	.1446
Expressive	12.09	4.98	9.60	4.31	.0038*
Sympathetic	6.21	3.56	6.81	3.82	.3311
Technical	4.93	3.02	8.12	3.87	.0001*

*Mean separation in rows by Duncan's Multiple range Test at .05 alpha level

**Some teachers had more than one student in the conference which yielded 68 paired responses.

Univariate analyses indicated that for variate B, the mean (m_{BM}=11.57) of female subjects was significantly (p=.0305) higher than the mean (m_{Bf}=10.24) of the male subjects; and for variate D, the mean (m_{DM}=5.00) of the female subjects was significantly (p=.0023) lower than the mean (m_{Df}=5.69) of the male subjects. Analysis indicated that female students were more expressive and slightly less technical in their leadership style than their male counterparts. Table 2 contains the means and standard deviations for the responses on the MBLS for the male and female subjects for each of the subscales A, B, C, and D.

The MANCOVA procedure test statistic Wilks' lambda found an overall significant (p=<.05) difference between rural and urban subjects in leadership style as measured by the MBLS. The follow-up canonical discriminant analysis performed after the significant difference was obtained yielded the following correlations between the MBLS subscales and the first discriminant function: 0.6650 (A), 0.2853 (B), -0.6828 (C), and -0.4247 (D). Examination of the coefficients revealed only variates A (bold) and C (sympathetic) contributed meaningfully, although in a contrasting manner, to discrimination between rural and urban subjects relative to leadership style. Univariate analyses indicated that for variate A, the mean (m_{Ar}=9.97) of rural subjects was significantly (p=.0342) higher than the mean (m_{Au}=8.08) of urban subjects, and for variate C, the mean (m_{Cr}=6.84) of the rural subjects was significantly (p=.0306) lower than the mean (m_{Cu}=7.56) of the urban subjects. Table 3 contains the means and standard deviations for the responses on the MBLS for rural and urban subjects for each of the subscales A, B, C, and D.

Conclusions

Research findings indicated that the selected FFA leaders were predominantly expressive in their leadership style. According to Marston (1979), high expressives may be described as

Table 2

Adjusted Male and Female Leadership Style Means,
Standard Deviations, and p-Values for
Univariate Analysis

Leadership Style	Male (202)		Female (140)		
	mean	sd	mean	sd	p-value
Bold	8.86	4.50	8.52	4.22	.9320
Expressive	10.24	4.08	11.57	3.88	.0305*
Sympathetic	7.21	3.44	6.78	3.42	.6917
Technical	5.69	2.86	5.00	2.83	.0023*

*Mean separation in rows by Duncan's Multiple Range Test at .05 alpha level.

Table 3

Adjusted Rural and Urban Leadership Style Means,
Standard Deviations, and p-Values for
Univariate Analysis

Leadership Style	Rural		Urban		
	mean	sd	mean	sd	p-value
Bold	8.97	4.48	8.08	4.07	.0342*
Expressive	10.86	4.02	10.54	4.14	.3736
Sympathetic	6.84	3.41	7.56	3.45	.0306*
Technical	5.31	2.81	5.68	3.00	.1723

*Mean separation in rows by Duncan's Multiple Range Test at .05 alpha level

persuasive, convincing, luring, charming, appealing, selling, inducing, and winning. As a result of these characteristics, expressive-type people enjoy contact with other people, are enthusiastic, speak well, exhibit poise, and motivate others (Brewer, 1989). Outstanding FFA leaders should possess these qualities or some combination of them. According to the Official FFA Manual (1993), leaders should exhibit a sincere desire to work with others, represent the chapter well in public relations, lead by example, and possess a desire to be a part of a leadership team. According to Brewer (1989), teachers who work with expressive personality types should provide opportunities for them to be involved with others and provide chances for them to speak or make presentations. Expressive students function best in a happy and friendly environment, and time should be allowed for them to fellowship and socialize.

Data analysis indicated that teachers were significantly more technical in their orientation than their students. This finding may be true because the duties associated with teaching such as lesson preparation, evaluation, and grading tend to be detail or rule-oriented and organized in nature. Also, the fact that agriculture is a scientific field lends further credibility to the need for a technical orientation. To enhance the productivity of students having high technical leadership styles, teachers should provide them with structure and organization. Technical individuals work best using logical analysis to complete step-by-step assignments. Technical personalities tend not to deal with conflict in a positive manner and thus need frequent reassurance to maintain their productivity (Brewer 1989).

Data analysis indicated that expressive individuals and technical individuals contributed in a contrasting manner to the discrimination between male and female subjects relative to leadership style. Results suggested that females were significantly more expressive in their style but significantly less technical than male students. This finding may suggest that leadership positions requiring the characteristics of the technical individual may more often be found in the male student, whereas the female student may function best in a leadership environment best suited to the expressive style. The difference found in the technical style, although statistically significant, may be limited in practical significance and should be evaluated accordingly.

Analysis of students by location (rural, urban) indicated that students from rural settings were significantly more bold but significantly less sympathetic in their leadership style than those from urban settings. The variable of difference appears to be the environment. The nature of rural or farm life may involve more characteristics associated with the bold style, such as more risk taking, less delegating, more directness and more confidence. The urban resident may rely more on the characteristics of the sympathetic leader which includes maintaining harmony and being more accommodating to others. Because community life involves more group decisions, urban students may be somewhat less decisive in nature. Once again, the statistical differences found between rural and urban students must be observed from a practical perspective.

Based on the findings of this study, specific recommendations include the following:

> Teachers should utilize preferred leadership style data when making leadership role assignments.
>
> Students and teachers need to be aware of their preferred leadership style in order to work more efficiently with others of differing leadership styles.

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Critique: **An Analysis of the Leadership Styles of Selected FFA Members and Their Advisors** (Washington, Perritt, McCune & McCune)

Discussed by
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Leadership behavior, or as in the case of this study leadership style, is of interest to leadership researchers and practitioners. It is assumed that many will lead as they have been led. Thus, appropriate leadership style is important for the teacher of the leadership development activities. This study examines the style phenomenon.

The researchers utilized an established instrument for the study. The My BEST Leadership Style (MBLS) instrument has been used in various research settings. It has high reported reliability. This instrument, like the Myers Briggs and others, rests on self reporting rather than external validation of style or type. It appears to be an appropriate and efficient way to determine the 4 leadership styles as defined by Babbie and others. Additional documentation concerning the validity of the MBLS would have been helpful for the reader.

The use of a purposive sample to study was justified in this study. The researchers are to be commended for the use of an approximation (in tact English classes) as a comparison group. In most cases, a required course such as English, is the best representation of the general population of a school. The 100% return of instruments is also to be commended.

The results and their implications were not what one might predict if it is assumed that students will be most likely to utilize the leadership style of their teacher. The results might be useful to teachers who could use the instrument to determine style and to understand an individual's mode of leadership. There does not appear to be one best style or combination of leadership styles. Thus it is difficult to recommend remediation or change strategies for an individual leader with identified leadership style. Additional study would be recommended before the MBLS would have practical use for a teacher other than for identification of style and the enhanced understanding that this might foster.

LEARNING AND TEACHING STYLES OF AGRICULTURAL AND TECHNOLOGY EDUCATION TEACHER EDUCATORS AND PRE-SERVICE TEACHERS

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Introduction

Every student is unique in their own way, including the way they learn. The characteristics of students' teachers are just as diverse as those of the students. Research suggests that the learning style and teaching style of teachers has implications for student learning (Gregorc & Guild, 1984). Studies have investigated the selected teacher characteristics of learning style (Avery, 1985; Witkin, 1973) and teaching style (Dunn & Dunn, 1979; Witkin, 1973; Gregorc, 1979; Koppleman, 1980). These areas of research indicate that individuals have the basic capability to learn and teach; however, they are not able to learn and teach effectively in the same exact way (Gregorc, 1979). Dunn and Dunn (1979) stated that not only do students learn in considerably different ways, but certain students succeed only through selected methods.

Traditionally, agricultural education has relied on the problem-solving approach for classroom instruction. Other vocational disciplines, such as technology education, are also advocates of the problem-solving approach to teaching (Raven & Shelhamer, 1993). The question that arises is how does the use of problem-solving interact with learners' and teachers' characteristics in high school agriculture and technology education classrooms as well as pre-service agricultural and technology teacher education programs? Ronning, McCurdy, and Ballinger (1984) argued that problem-solving must consider at least three dimensions: knowledge domain, problem-solving methods, and characteristics of learners. Ronning et al. (1984) contended that the first two dimensions are now widely accepted as essential for problem-solving, but there were no theories of problem-solving which took into account systematic individual differences. Ronning et al. (1984) concluded that modification of problem-solving instruction in ways consistent with students' learning styles seems an inevitable consequence. One dimension not considered by Ronning et al. (1984) was the characteristics of the teachers.

In 1991, Cano, Garton, and Raven concluded that despite the amount of related research regarding learning styles, teaching styles, and personality styles, agricultural teacher educators may be unable to fully utilize the results because agricultural teachers were not included in the samples of previous research. Since the study by Cano et al. (1991) there have been a number of studies that have investigated the learning styles and teaching styles of pre-service agriculture and technology education teachers.

Cano, Garton, and Raven (1992a) found that the learning styles of pre-service agriculture teachers in Ohio do differ. Another study by Cano, Garton, and Raven (1992b) found a moderate relationship between pre-service teachers' learning styles and their ability to demonstrate the problem-solving approach to teaching in a microteaching laboratory. Cano et al. (1992b) found that pre-service teachers that tended to be field-independent tended to do a better job of demonstrating the problem-solving approach to teaching. Similar research by Raven and Shelhamer (1993) found no relationship between learning style and the ability to demonstrate the problem-solving approach to teaching. A study by Raven, Cano, Garton, and Shelhamer (1993) found that Ohio and Montana pre-service agriculture teachers differ in terms of age, learning style, teaching style, and personality style. Raven and Shelhamer (1993) also found that pre-service agriculture and technology education teachers differ in their learning styles. Pre-service agriculture teachers tended to be field-independent while technology education pre-service teachers tended to be field-dependent.

These studies have focused on the characteristics of the pre-service teacher. However, the characteristics of the teacher educators responsible for the education of these pre-service teachers should also be considered. Perhaps the learning and teaching styles of the teacher educator influences the ability of pre-service teachers to learn and use the problem-solving approach to teaching. Researchers have commented on the need to study the learning and teaching styles of agricultural and technology education teacher educators (Raven et al., 1993; Raven & Shelhamer, 1993; Cano et al., 1992a).

Theoretical Framework

Learning Style: In considering learning styles, the influence the surrounding field has on a person's perception of items within the field as well as its impact on the person's intellectual domains and personality traits have been extensively studied. Witkin (1973) has shown that a person who's mode of perception is strongly dominated by the surrounding field is said to be leaning towards a field-dependent learning style. A person who perceives items as more or less separate from the surrounding field leans toward a field-independent learning style.

Individuals with a field-dependent learning style tend to perceive the world in a global fashion. Field-dependent learners are socially oriented and best learn material with a social content. Field-dependent learners require externally defined goals and must be provided with organization. Consequently, they may need more explicit instruction in problem-solving strategies. As teachers, field-dependent learners tend to use student-centered activities. They are strong in establishing a warm and personal learning environment. Teachers that are field-dependent are also less likely to provide negative feedback and evaluation towards the student (Witkin, 1973).

Field-independent learners view the world more analytically. Field-independent learners rely on self-defined goals and self-structured situations. Teachers with a field-independent learning style are more subject-centered in their instruction. Field-independent teachers serve more as a "guide" than a "teacher" for their students. Field-independent teachers place more emphasis on the cognitive aspect of instruction. They are more likely to use an inquiry or problem-solving approach to learning due to their analytical perspective (Witkin, 1973).

Teaching Style: Van Tilburg and Heimlich (Heimlich, 1990), in an attempt to describe an individual's teaching style, defined two domains: sensitivity and inclusion. The sensitivity domain is based on the ability of the teacher to sense the shared characteristics of the group of learners. The inclusion domain is based on the teacher's willingness and ability to utilize instructional strategies that take advantage of the group's characteristics. An individual can be classified into one of four teaching styles based on their sensitivity and inclusion scores.

The low inclusion and low sensitivity quadrant is labeled "expert". The "expert" teacher is subject oriented and tends to use the lecture method of instruction. Teachers scoring in the low inclusion and high sensitivity quadrant are termed "providers". "Providers" are learner-centered and seek to teach effectively. "Providers" tend to use group discussion, demonstrations, and guided activities. The quadrant defined by high inclusion and low sensitivity is labeled "facilitator". Teachers falling into this category are teacher-centered and the method of instruction is dictated by the subject matter. Teachers in the final quadrant with scores of high inclusion and high sensitivity are "enablers". "Enablers" are very learning-centered as the learners define both the activity and the process in the learning environment (Heimlich, 1990).

Purpose and Research Questions

The purpose of this study was to determine, compare, and contrast the learning and teaching styles of agricultural and technology education teacher educators and pre-service teachers in the Agricultural and Technology Education Programs at

Montana State University (MSU). The following research questions were used to guide this investigation:

1. What was the gender of agricultural and technology education teacher educators and pre-service teachers at MSU?
2. What was the preferred learning style of agricultural and technology education teacher educators and pre-service teachers at MSU as measured by the Group Embedded Figures Test (GEFT)?
3. What was the preferred teaching style of agricultural and technology education teacher educators and pre-service teachers at MSU as measured by the Van Tilburg / Heimlich Teaching Style Preference Inventory (VHTSP)?

Methods

The populations for this descriptive study were agricultural and technology education teacher educators and pre-service teachers in the Agricultural and Technology Education Programs at MSU. The pre-service teacher sample (n=39) was junior and senior pre-service agriculture and technology education teachers enrolled in the programs' methods of teaching course during the Fall Semesters of 1991, 1992, and 1993. The teacher educator sample (N=6) was a census of the teacher educators that were faculty during the 1991-1992, 1992-1993, and 1993-1994 school years in the Agricultural and Technology Education Programs at MSU.

The GEFT was administered to determine the preferred learning style of the subjects as either field-dependent or field-independent. The GEFT is considered a standardized instrument and has been tested for validity and reliability (Witkin, Oltman, Raskin, & Karp, 1971).

The VHTSP was used to ascertain the subjects' preferred teaching style. Although the VHTSP has not been standardized, it has been tested for reliability and validity by its authors (Heimlich, 1990) and has been used extensively providing valid and reliable results.

Both instruments were administered to the pre-service teachers at the beginning of the Fall Semester during which they were enrolled in the programs' teaching method course. Both instruments were administered to the teacher educators during the 1993 Fall Semester. Since the pre-service sample was not random inferential statistics were not reported and results should not be inferred to the population. All instruments were hand scored by the researchers and the data were analyzed using SAS.

Results and Conclusions

The results indicated that 72% (28) of the pre-service teachers were males and 28% (11) were females (Table 1). Over two-thirds of the pre-service agriculture teachers were male (20) and one-third were female (9). Eight out of the ten pre-service technology education teachers were male and two were female. All of the teacher educators were male. These results indicate that women are under-represented in agricultural and technology pre-service education in Montana. The lack of females in the technology education pre-service program is especially evident.

Table 1. Gender of Agricultural and Technology Education Teacher Educators (N=6) and Pre-service Teachers (n=39)

	Faculty				Students				Total			
	Ag Ed		Tech Ed		Ag Ed		Tech Ed		Faculty		Students	
Gender	N	%	N	%	N	%	N	%	N	%	N	%
Female	0	0.0	0	0.0	9	31.0	2	20.0	0	0.0	11	28.2
Male	3	100	3	100	20	69.0	8	80.0	6	100	28	71.8
Totals	3	100	3	100	29	100	10	100	6	100	39	100

Data showed that 67% (26) of the pre-service teachers were field-independent learners and 33% (13) were field-dependent learners (Table 2). Nearly 80% (23) of the pre-service agriculture teachers were field-independent. However, nearly three-fourths (7) of the pre-service technology education teachers were field-dependent. All of the technology education teacher educators (3) were field-independent. Two of the agricultural education teacher educators were field-independent and one was field-dependent.

The finding that agricultural education pre-service teachers tend to be field-independent is consistent with other studies that examined the learning styles of pre-service agriculture teachers. The learning styles of the agricultural education teacher educators more closely reflects the learning styles of their pre-service teachers than the learning styles of the technology education teacher educators. Technology education pre-service teachers tend to be field-dependent while the technology education teacher educators were all strongly field-independent.

Table 2. Learning Styles of Agricultural and Technology Education Teacher Educators (N=6) and Pre-service Teachers (n=39)

	Faculty				Students				Total			
	Ag Ed		Tech Ed		Ag Ed		Tech Ed		Faculty		Students	
Field	N	%	N	%	N	%	N	%	N	%	N	%
Dependent	1	33.3	0	0.0	6	20.7	7	70.0	1	16.7	13	33.3
Independent	2	66.7	3	100	23	79.3	3	30.0	5	83.3	26	66.7
Totals	3	100	3	100	29	100	10	100	6	100	39	100

Teaching style results indicated that pre-service teachers mostly preferred a learner-centered approach to teaching (Table 3). The data showed that 90% (35) of the pre-service teachers preferred the "enabler" teaching style. The other 10% (4) of the pre-service teacher preferred the "provider" teaching style. The percentages of agricultural and technology education pre-service teachers that preferred the "enabler" teaching style were very similar. No pre-service teachers preferred the "expert" style or the "facilitator" style. All of the agricultural and technology education teacher educators preferred the "enabler" teaching style.

Both agricultural and technology education pre-service teachers as well as teacher educators tended to prefer a student-centered approach to instruction. The similarity in teaching styles among pre-service teachers and teacher educators of agricultural and technology education contrasts sharply with the differences in the learning styles of technology education pre-service teachers and teacher educators as well as the differences between agricultural and technology education pre-service teachers. Perhaps the teaching styles teacher educators has more influence on the teaching styles of pre-service teachers than teacher educators' learning styles has on pre-service teachers' learning styles. These pre-service teachers are in their junior and senior year and have had numerous courses with both agricultural and technology education teacher educators since many courses are required for both majors. Consequently, pre-service students have seen the teacher educators' teaching style modeled many times.

Table 3. Teaching Styles of Agricultural and Technology Education Teacher Educators (N=6) and Pre-service Teachers (n=39)

	Faculty				Students				Total			
	Ag Ed		Tech Ed		Ag Ed		Tech Ed		Faculty		Students	
Style	N	%	N	%	N	%	N	%	N	%	N	%
Enabler	3	100	3	100	26	89.7	9	90.0	6	100	35	89.7
Provider	0	0.0	0	0.0	3	10.3	1	10.0	0	0.0	4	10.3
Facilitator	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Expert	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Totals	3	100	3	100	29	100	10	100	6	100	39	100

Technology education pre-service teachers tended to be older than pre-service agricultural education teachers. The mean age of technology education pre-service teachers was 34 while the mean age of agricultural education per-service teachers was 27 (Table 4). Agricultural education teacher educators tended to be older than technology education teacher educators. The mean age of agricultural teacher educators was 47 and the mean age of technology education teacher educators was 43. The means of the agricultural and technology education pre-service teachers indicate that both groups tend to be older than traditional age college students. The relatively high mean age of technology education pre-service teachers indicate that these students are most likely mature adult learners that bring a lot of life experiences to their learning environment.

The mean GEFT score of 9.7 for technology education pre-service teachers was varied from the national norm of 11.8 (Table 4). The mean GEFT score of 13.6 for agricultural education pre-service teachers also varied from than the national norm. The mean GEFT score of 12.0 for agricultural education teacher educators was very close to the national norm while the mean GEFT score of 17.3 for technology education teacher educators indicates that they strongly prefer a field-independent learning style. The differences in learning styles among agricultural and technology education pre-service teachers may be partly attributable to the differences in age among the two groups. People tend to become more field-dependent as they age (Witkin, 1973).

The mean sensitivity score of 9.0 for teacher educators was higher than the mean score of 8.5 for pre-service teachers (Table 4). The mean inclusion scores of 7.4 for pre-service teachers and 7.5 for teacher educators were similar. The mean inclusion and sensitivity scores for agricultural and technology education pre-service teachers were also similar. The results of this study indicate that both pre-service teachers and teacher educators are very learning-centered and wish to involve learners in defining both the activity and the process in the learning environment. Perhaps an explanations for this is the older age of these pre-service students. Since both groups of pre-service teachers tend to be older than traditional age college students they may place a greater emphasis on the life experiences that they bring into the classroom. As a result, they are more sensitive to those experiences and are more likely to prefer to include the wants and needs of students into their teaching.

Table 4. Mean Values of Selected Variables for Agricultural and Technology Education Teacher Educators (N=6) and Pre-service Teachers (n=39)

	Faculty				Students				Total			
	Ag Ed		Tech Ed		Ag Ed		Tech Ed		Faculty		Students	
Variable	X	SD	X	SD	X	SD	X	SD	X	SD	X	SD
Age	47.3	12.5	43.3	4.0	26.9	7.1	33.8	6.9	45.3	8.6	28.7	7.6
GEFT	12.0	6.6	17.3	0.6	13.6	3.7	9.7	5.8	14.7	5.1	12.6	4.5
Teaching Style												
Inclusion	7.0	0.7	8.0	1.2	7.4	0.8	7.5	0.9	7.5	1.0	7.4	0.8
Sensitivity	8.8	1.8	9.2	0.7	8.5	0.9	8.4	1.1	9.0	1.2	8.5	1.0

Implications

The agricultural and technology education programs in Montana are under-represented in terms of female pre-service teachers. This is probably a reflection of the under-representation of females currently teaching technology and agricultural education in Montana. According to the 1993-1994 Montana Technology Education Directory there are no female technology teachers currently teaching in Montana and the 1993-1994 Montana Agricultural Education Directory shows just three female high school agriculture teachers in Montana. Teacher educators in both disciplines need to recruit more females into the agricultural and technology education teacher education programs.

Teacher educators in the Agricultural and Technology Education Programs at MSU are teaching students with diverse learning styles. This is especially evident in the technology education program where all of the teacher educators are field-independent and the pre-service teachers tend to be field-dependent. Additionally, since both agricultural and technology education teacher educators teach both agricultural and technology education pre-service teachers due to shared courses, the teacher educators need to take into account these different learning styles when teaching their courses. Both agricultural and technology education teacher educators should utilize a wide variety of teaching strategies that would appeal to both field-dependent and field-independent learners.

The differences in learning styles between technology education pre-service teachers and teacher education raises some questions. Why are the learning styles between technology education teacher educators and pre-service teachers so different? Is there a connection between these differences in learning styles and the small enrollment in the technology education teacher education program? What are the learning styles of technology education students in the industry option of the technology education program? Are the differences between the pre-service teachers and teacher educators in technology education because the teacher educators were originally educated under the more traditional industrial arts curriculum? More research is needed in order to explain these differences.

The preferred teaching styles of agricultural and technology education teacher educators and pre-service teachers were very similar. Is this the result of the teacher educators' influence on the pre-service teachers over the three to four years that the pre-service teachers have spent in the program? Pre-service teachers should be tested when they enter the program in order to ascertain if their teaching styles change during the course of their pre-service program. Additionally, are the preferred teaching styles of the teacher educators and pre-service teachers their actual teaching style? Or do their actual teaching styles differ from their preferred teaching styles. The actual teaching styles of the teacher educators should be investigated as well as the teaching styles of the pre-service students during their student teaching experience.

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LEARNING AND TEACHING STYLES OF AGRICULTURAL AND TECHNOLOGY EDUCATION TEACHER EDUCATORS AND PRE-SERVICE TEACHERS

A CRITIQUE

Discussant: Vernon D. Luft, University of Nevada

The purpose of this study was to determine, compare, and contrast the learning and teaching styles of agricultural and technology education teacher educators and pre-service teachers in the Agricultural and Technology Education Programs at Montana State University. A sound literature review and theoretical framework was provided for the conduct of the study.

The first objective was to determine the gender of agricultural and technology education students and teacher educators at Montana State University. This data was reported. However, no comparisons were made of teaching and learning styles between male and female respondents. Since the researchers had gender data, it would have been interesting to know if there were differences in teaching and learning styles of male and female pre-service teacher education students.

The methodology used in this study was sound and appropriately explained in the paper. Results and conclusions were clearly described. It was reported that agricultural education teacher education students and teacher educators were closely aligned with regard to their learning styles. On the other hand, technology teacher educators and pre-service teachers tended to differ. The pre-service technology students more closely matched the learning styles of agricultural education students and teacher educators. Would the fact that the technology students were being taught by agricultural education faculty in the methods course and enrolled along with agricultural education students have an influence on their learning style?

Age of pre-service teacher education students was used as a basis for comparison. It was reported, "The differences in learning styles among agricultural and technology education pre-service teachers may be partly attributable to the differences in age among the two groups." This is a conclusion that could perhaps be tested by analyzing data among various ages within groups.
The authors indicated that the average age was older than the "traditional" college age student. What is the traditional college age student? Is it possible that the previous non-traditional students now becoming the traditional?

The authors are to be commended for conducting an interesting and well conducted study. The authors raised several questions within their report that may provide fuel for further research. Perhaps one of the most important questions is how will the results of this research be applied? How will it make a difference in the preparation of teachers in agricultural and technology education at Montana State University?

A COMPARISON OF LEARNING STYLES, TEACHING STYLES AND PERSONALITY TYPES OF PRESERVICE STUDENT TEACHERS AT TWO WESTERN UNIVERSITIES

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Introduction

In the past decade, agricultural educators have spent countless hours in one-on-one conversations and among larger audiences discussing the future mission, purpose and clientele of the agricultural education profession. Swanson (1991) offered focus to these concerns in one sentence. "The first and most important imperative for the future of agricultural education is to again focus on people". Has the profession lost sight of the fact that as agricultural educators the most important people in the profession are the students?

In a study by Nichols and Mundt (1993), it was reported that a significant difference existed between agricultural educators and home economics educators in the importance placed on individual student differences; agricultural educators placed individual student differences very low on their list of teaching priorities. Yet, teaching and learning, which are highly influenced by individual differences, should be the heart of the mission in agricultural education. Warmbrod (1992) wrote, "Teaching and learning are the core of the intellectual content of agricultural education as an academic endeavor..." (p.26). The focus of the profession must continue to be the deep, rich, complex study of teaching and learning.

"As teachers, we invest a great deal of time thinking about and preparing for what we should teach. Likewise, we should spend an equal amount of time thinking about and preparing for how we should teach" (Cox and Zamudio, 1993). How we teach should be directly correlated to the learning styles of the students in the class. Cano (1991) suggested that "...responsibilities of the instructor are to encourage all learners to learn, provide choices for learners, and above all else, adapt the teaching style to fit the learning style of the learners". If instructors are expected to adjust teaching styles to fit learning styles, some understanding of teaching styles and learning styles is in order.

Student Styles of Learning

Learning styles is not a new concept. However, because educational practitioners discovered learning style technology at about the time most psychologists were losing interest, progress in the area has been slow (Keefe and Monk, 1986).

Learning style refers to the predominant and preferred manner in which individuals take-in, retain, process, and recall information. "...Learning style is demonstrated in that pattern of behavior and performance by which an individual approaches educational experiences...Learning style represents both inherited characteristics and environmental influences" (Keefe and Monk, 1986, p. 1-2).

According to Cano, Garton and Raven (1992), two of the most widely studied learning styles are field-dependent and field-independent. Witkin, Moore, Goodenough and Cox (1977) described the extremes of the aforementioned continuum as follows: when perception is strongly dominated by the prevailing field (a region, space or sphere where mental or physical activity exists), that mode of perception is designated as "Field Dependent", but when the person experiences items as more or less separate from the surrounding field, the perception is designated as "Field Independent" (p. 7). Gaining an awareness of field-dependence and field-independence should add to teachers' and students' ability to use their learning style, appreciate the style differences of others, and to begin thinking about the best classroom methods for facilitating effective learning.

Cano, et al. (1992) indicated that teachers with a field-dependent learning styles socially orient their students, by encouraging them to work cooperatively. Field-independent teachers make it clear that "I am the authority" and "am responsible for guiding the student. They are subject centered and emphasize the importance of individual student effort (Cano, et al., 1992).

Teachers' Learning Style

Just as students have a preferred learning style, so do teachers, and that learning style influences the effectiveness of the teacher. Is it possible that students who perform better in a given class just happen to match the learning style of the instructor? Gregorc and Ward (1977) found that if the approach fit the preferred learning mode, the learner usually reacted favorably, while on the other hand, if styles were mismatched, the teachers reported that the students "worked hard to learn" or "tuned out". Gregorc and Ward asked, "How can a teacher endeavor to better match the learning preferences of the broad spectrum of students" (p. 24)?

One response was offered by Raven (1992) who suggested, "...teachers that are aware of their learning style as well as the styles of their students, are better able to make sure that any differences between their learning styles will not impede learning" (p. 5). Thus, taking the time to measure learning style preferences of teachers and learners seems to be a key, and, according to Rollins and Yoder (1993) will pay dividends in achievement in the end. "Research has demonstrated that learning style preferences and the consideration educators give to learning styles are closely related to learning achievement..." (p. 19).

Teachers' Teaching Style

Teachers also possess a teaching style. Heimlich (1990) identified sensitivity and inclusion as the two domains of teaching style. "The sensitivity domain is based on the ability of the teacher to 'sense' the shared characteristics of the group learners. Inclusion domain is the teacher's willingness and ability to utilize techniques to enhance the learning experience based on the group's characteristics" (Cano, et al., 1992, p. 48). Within these two domains teachers can be labeled as "expert" (subject-oriented, seeking efficiency through lecture), "provider" (learner-centered, utilizing group discussion and demonstrations), "facilitator" (teacher-centered, focusing instruction more upon subject matter than learners), or "enabler" (Learner-centered, encouraging learners to define both the activity and the process) (Cano et al., 1992).

Teachers' Personality Type

The Myers-Briggs Personality Type Indicator is concerned with individual differences in people. The instrument addresses those differences by focusing on how people spend their time, focus their attention, receive information, see the "big" picture, solve problems, arrive at decisions, and live their lives on a daily basis. The four scales used in the personality inventory include: Extroversion-Introversion (EI, whether people focus on the outer or inner world), Sensing-Intuitive (SN, whether people gather information by using their senses or their intuitions), Thinking-Feeling (TF, whether people make decisions based upon thinking or based upon feelings), or Judgment-Perception (JP, how people orient themselves to the outer world) (Cano, et al., 1992).

Purpose and Objectives

The purpose of this descriptive-correlational study was to compare the preferred learning style, teaching style and personality types of senior preservice student teachers in agricultural education at the University of Idaho and Montana State University. Specific research questions were:

1. What was the comparison of the preferred learning style of preservice student teachers as measured by the Group Embedded Figures Test?
2. What was the comparison of the preferred teaching style of preservice student teachers as measured by the VanTilburg/Heimlich Teaching Style Inventory?
3. What was the comparison of the personality type of preservice student teachers as measured by the Myers-Briggs Type Indicator?

Methodology

Population and Sample

The target population for this study was preservice students majoring in agricultural education at the University of Idaho and Montana State University. The sample was preservice teachers who had student taught during the previous three semesters (Fall, 1992; Spring, 1993; Fall, 1993). The sample (n = 31) included 16 students at the University of Idaho (three females and 13 males) and 15 students at Montana State University (four females and 11 males).

Instrumentation

The Group Embedded Figures Test (GEFT) (Oltman, Raskin, and Witkin, 1971), VanTilburg/Heimlich Teaching Style Preference (VHTSP) (Heimlich, 1990) and the Myers-Briggs Type Indicator (MBTI) (Myers, 1977) were administered to students during class sessions of the methods of teaching courses. The GEFT was used to determine whether the learning style of the preservice student teachers was field-independent or field-dependent. The national mean of the test was used to determine field-dependence or field-independence.

The VHTSP contains 22 items designed to determine the preservice student teachers preference for sensitivity or inclusion as it relates to teaching. The MBTI contains 116 items which measure an individual's personality characteristics on four scales which are described by using words at the opposite ends of the continuum: Extroversion-Introversion (EI), Sensing-Intuitive (SN), Thinking-Feeling (TF), Judgment-Perception (JP).

The GEFT and MBTI are standardized instruments that have been tested for validity and reliability by the respective authors. The VHTSP has been tested for validity and reliability by the authors.

Data Analysis

The SAS computer package was used to analyze the data. The instruments were hand scored by the researchers and the aggregate data were analyzed.

Findings

Characteristics of Participants

The results indicated there were 73% males (11) and 27% females (4) in the MSU sample while the U OF I sample consisted of 81% males (13) and 19% females (3). Forty-

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seven percent of the MSU males were non-traditional age students (25 years or older) while 20% of the MSU female students were traditional age (less than 25 years of age) (Table 1). Overall, approximately half the MSU subjects were traditional age students and half were non-traditional age. Two-thirds of the U OF I subjects were non-traditional age students. The U OF I sample had a greater proportion of non-traditional age students while MSU had a greater percentage of female preservice student teachers. The majority of preservice student teachers at both U OF I and MSU were non-traditional age students.

Table 1
Comparison of gender and age by preservice student teachers at Montana State University and University of Idaho by percent.

	MSU Nontraditional	U of I Nontraditional	MSU Traditional	U of I Traditional
Female	7%	6%	20%	13%
Male	47	56	27	25
Total	54	62	47	38

Note. Traditional age = less than 25 years. Nontraditional age = 25 years or more
N for MSU = 15, N for U of I = 16

Learning Styles of Participants

Data showed that 73% (11) of the MSU subjects were field-independent learners and 27% (4) were field-dependent learners while 75% (12) of the U OF I subjects were field-independent and 25% (4) were field-dependent (Table 2). In the MSU and U OF I samples, about one-fourth of the males were field-dependent, while all of the females were field-independent. The mean GEFT scores for all MSU and U OF I subjects was approximately 13 which is higher than the national norm of 11.3. The tendency for both MSU and U OF I females to become more independent than their male counterparts is opposite to what the literature would suggest (Witkin, et al., 1971). MSU scores ranged from 2 to the maximum of 18 while the U OF I scores ranged from 4 to the maximum. The GEFT findings suggest that female preservice agriculture teachers tend to be more field-independent than females in the general population. Overall, learning styles were

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similar between the two institutions in terms of proportion of field-independence to field-dependence.

Table 2
Comparison of field-dependent and field-independent learners at Montana State University and University of Idaho by percent.

	MSU Field Dependent	U of I Field Dependent	MSU Field Independent	U of I Field Independent
Female	0%	0%	26%	19%
Male	27	25	47	56
Total	27	25	63	75

Note. N for MSU = 15, N for U of I = 16

Examination of the GEFT scores by age of MSU students revealed that non-traditional age students tended to be more field-dependent than traditional age students (Table 3). Of the non-traditional age U OF I students and traditional age students, half were field-dependent and half were field-independent while a greater proportion of non-traditional age students were field-independent.

Table 3
Comparison of age to field-dependent and field-independent learners at Montana State University and University of Idaho by percent.

	MSU Field Dependent	U of I Field Dependent	MSU Field Independent	U of I Field Independent
Nontraditional	20%	13%	33%	50%
Traditional	7	13	40	25
Total	27	26	73	75

Teaching style results indicated that MSU subjects preferred a learner-centered approach to teaching (Table 4). The data showed that 100% (15) of the MSU preservice teachers preferred the "enabler" teaching style. The majority of U OF I preservice teachers also preferred a learner-centered teaching style. However, four U OF I students preferred the "provider" and "facilitator" teaching styles. The results of the study indicate that the majority of MSU and U OF I preservice student teachers preferred a more

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learner-centered approach to teaching, but some U OF I students differed. The majority of subjects at both institutions were field-independent; however, the field-independent characteristics of being subject-centered was not evident.

Table 4

Comparison of teaching styles at Montana State University and University of Idaho by percent.

	MSU Enabling	U of I Enabling	MSU Facilitating	U of I Facilitating	MSU Providing	U of I Providing
Female	27%	6%	0%	6%	0%	6%
Male	73	69	0	6	0	6
Total	100	75	0	12	0	12

Note. N for MSU = 15, N for U of I = 16

The MBTI results indicated that the majority of the MSU subjects were either ISTJ, ENFP, or ENTP. Two-thirds (10) of the MSU students were E while 5 were I on the Extroversion-Introversion (EI) dimension. On the Sensing-Intuition (SN) dimension, 53% (8) of the MSU subjects were N and 47% (7) were S. Overall, 53% (8) of the MSU subjects were T while 47% (7) were F. On the final dimension 53% (8) of the MSU subjects were P while the remaining 47% (7) were J.

The U OF I subjects were spread across several dimensions with the most being either ENFP, ENTP, ESTP, ISTP, or ISTJ. In analyzing the (EI) dimension for the U OF I sample, nearly two-thirds (10) were E and 38% (6) were I. On the (SN) dimension, 75% (12) were S and 25% (4) were N. Analysis of the (TF) dimension, 75% (12) were T and 25% (4) were F. Results of the (JP) dimension showed that 63% (10) of the U OF I subjects were J and 38% (6) were P.

These samples differed in two personality dimensions, SN and TF. The majority of U of I students tended to be "sensing" and "thinking" while MSU students were split nearly half and half between "sensing-intuition" and "thinking-feeling".

Field-independent learners, according to the literature, tend to be intrinsic, but this was not supported by the personality data for the MSU and U OF I females. The majority

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of females from both samples were E as well as being field-independent based on their GEFT. However, the overall MSU teaching style data was not consistent with scores on the EI dimension. With nearly half of the MSU subjects being I, one would not expect the teaching style data to show such a preference towards learner-centered instruction.

U OF I scores on the Thinking-Feeling (TF) dimension tended to be consistent with GEFT scores. Field-independent learners tended to be a T on the MBTI. Being a "thinker" rather than a "feeler" is characteristic of a field-independent learner. However, MSU females who tended to be field-independent also tended to be feelers rather than thinkers.

Conclusions

The following conclusions are based upon the researchers' interpretations of the results of this study.

1. Montana State University and University of Idaho had nearly equivalent numbers of student teachers during the previous three semesters.
2. Montana State University and University of Idaho enroll high percentages of students age 25 years and over.
3. Learning styles of Montana State University and University of Idaho preservice student teachers are proportionally similar, field-independence to field-dependence.
4. Montana State University and University of Idaho preservice student teachers in agriculture tend to be extroverts who are either judging or perceptive.
5. Montana State University and University of Idaho preservice student teachers' personalities differ on the SN and TF dimensions.
6. Montana State University and University of Idaho students prefer student-centered teaching styles.
7. Montana State University and University of Idaho female preservice student teachers tended not to enter teaching.

Implications

The addition of the U of I data to the MSU database supports the findings of an Ohio State University study (Cano et al., 1991) which suggested that preservice student teachers, individually, do differ in learning styles, teaching styles and personality types. However, students in these two western universities tended to be quite similar while data from a comparison of MSU and Ohio State University students showed that Montana and Ohio students were quite different on many variables. Why the differences?

Why do MSU and U of I enroll so many nontraditional aged students, for example? Could it be that experienced farmers and ranchers are seeking alternative employment opportunities? Has the change in economy due to active environmental stands influenced college enrollments in the western United States? If the preservice teachers are different from one region to another, are the current teachers different between regions? If so, what does this information tell us about the clientele being served and the potential audience to be served? More data needs collected to further study these variables to determine support or lack of support for generalizing preservice student/teacher characteristics from region to region.

At both U of I and MSU, females tended to be more field-independent than the national norm for the GEFT. Students at both institutions tended to prefer student-centered instruction. Based on the literature, one would not usually associate these characteristics. Why do the females at these western universities tend to be different from the national norms and from previous literature? Are these the women who have broken down an initial barrier to entering the profession? These variables need to be studied longitudinally such that trends and associations can be found.

Likewise, the females need to be studied such that more data can be generated regarding placement of females into teaching. One of the seven women in this study became an agriculture instructor. Do females in the western region tend to find it difficult to be placed as an agriculture instructor? More studies need to be conducted.

The mean GEFT scores for students at both western universities in this study were above the national norm. What are the factors which influence students to score above the national average, thereby possessing a more field-independent learning style than students nationally? More research needs to be conducted to compare other preservice student teachers.

Cano et al. (1991) wanted to know why students, specifically the field-independent learners, place a high value on being learner-centered. One plausible explanation may be that preservice teachers who are field-independent place a high value on being learner-centered as students, but when they start to teach the field-independent characteristic of being subject-centered will become more evident. Further investigation is needed to determine why field-independent learners place such a high value on student-centered instruction (Raven et al., 1993).

What should teacher educators do?

Teacher educators know that the personalities of preservice students are different; merely meeting the new class makes this claim evident. Is it appropriate to ignore this naturally occurring phenomenon? It is absolutely wrong.

There is a need for teacher educators to explore the personality types of students and to discover the learning styles and thus teaching styles associated with those personalities. By collecting data regarding the personality types, learning styles and teaching styles of preservice teachers in agriculture, and then using the data to teach about these individual differences, the teaching has meaning to the students and the learning comes to life in the classroom.

If a preservice student's personality is extrovert-sensing-feeling-judging (ESFJ), and the same student's learning style is field-dependent, and the same student has a preference for the "enabling" style of teaching, what does that tell teacher educators about the teaching techniques and methods preferred by that student? What does that tell teacher educators about the way that student learns best, and therefore about the way that the student will want to teach?

There is much to learn about preservice student teachers in regards to learning styles, teaching styles, and personality types. Research should be continued in this complex area of teaching and learning.

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A COMPARISON OF LEARNING STYLES, TEACHING STYLES AND PERSONALITY TYPES OF PRESERVICE STUDENT TEACHERS AT TWO WESTERN UNIVERSITIES

A CRITIQUE

Discussant: Vernon D. Luft, University of Nevada

The purpose of this research was to compare the preferred learning style, teaching style and personality types of senior preservice student teachers in agricultural education at the University of Idaho and Montana State University. The methodology is similar to research reported at this conference by Raven, Shelhamer, and Wright.

The authors have written a research report that is clear and concise. The introduction and discussion of student learning styles, teachers' learning styles, teachers' teaching styles, and teachers' personality type provided a sound theoretical framework for the conduct of the study. The purpose and research questions were also clearly stated. However, the last research question asked, "What is the relationship between demographics and learning style, teaching style and personality type of preservice student teachers?" What demographics are the researchers comparing? Describing specific demographics would be helpful.

The authors used traditional and non-traditional students as characteristic with which to make comparisons. Traditional students were defined as those under 25 years old, while non-traditional students were those 25 years or more. Was this a definition decided upon by the researchers, or was it one defined in universal descriptions of university students? As the average age of university students increases, does the definition of traditional and non-traditional students change?

The learning styles, teaching styles, and personality types of University of Idaho and Montana State University students enrolled in a methods course was clearly described. What is the practical application and use for this data?

A part of the findings was devoted to a discussion regarding placement of the preservice student teachers into teaching positions. What did this have to do with the study? There was not a research question addressing this as part of the study.

Generalizations or conclusions cannot be made beyond those agricultural education teacher education students enrolled in methods at MSU and U of I during the 1992-93 academic year. Each conclusion should be more clearly stated so a reader would realize they are not being generalized beyond your sample group.

This was an interesting research report. The authors are to be commended for a very fine study.

AGRICULTURAL EDUCATION PREPARATION PROGRAMS IN THE WESTERN REGION

by

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Introduction

Public education in Agricultural Education in America is constantly evolving and is in the midst of what may well be radical changes in organization as well as in curriculum (National Research Council, 1988). Not only is the profession changing rapidly, but the patterns by which new teachers are educated and brought into the profession are undergoing dramatic revisions in many states (Iverson and Trussell, 1988).

The primary purpose of Agricultural Education is to prepare men and women to enter the field of Agricultural Education as professional practitioners. Future Agricultural Education teachers must continue to be educated in the most advanced aspects of technical agriculture and natural resources as well as in professional education preparation. The academic program at the undergraduate level must therefore be based upon those professional technical competencies needed by beginning agricultural educators. These competencies should serve as a foundation upon which professional education courses can contribute and reinforce instructional skills.

Agricultural Education, as a profession in many states, has continued to add a disproportionate number of general professional education courses with subsequent reduction of technical agriculture and professional agricultural education courses. Some of these added courses can be attributed to increased state certification requirements but some may also be the result of political maneuvering within universities and colleges in order to increase student head count, retain faculty or other related reasons. It is therefore imperative that Agricultural Educators reexamine the total program of Agricultural Education teacher preparation; not as a series of possibly unarticulated courses.

In the past ten years, enrollments in Agricultural Education at many universities and colleges have declined, or have taken on different appearances at the various institutions such as technical subject matter options or increased student teaching requirements. In some states where teacher shortages have occurred, teachers are being hired without Agricultural Education training to fill positions in secondary programs. More teachers are looking for increased opportunity by transferring to other states because of the increased number of jobs available in Agricultural Education. Some states also have added more teacher preparation sites or have provided alternative means in teacher preparation to meet the demand created by the shortage of agricultural teachers in the Western Region.

Curriculums in Agricultural Education are developed independently by colleges and universities. State certification standards are usually the major regulatory curriculum mandates. There are no national requirements or standards set for patterns of preparation. The same is true for the content of secondary Agricultural Education classes.

There is a long history of implicit standards used in informal program comparisons. There are also very broad standards utilized by accreditation bodies. Though the programs are independent, when evaluations begin, often the first question asked is "What do they do in other states?" or What do they do in other AgEd secondary programs?" This has led to significant similarities between programs. It is possible, for example, to see the same text books, reference texts and farm magazines and journals in secondary schools as widely separated as Florida and Washington. The same may also be found in teacher education. This has created very similar programs and backgrounds for accreditation visitors and others charged with evaluation.

It is therefore appropriate, as one source of supporting information, to study the curriculums of other institutions and schools. The collective professional input should operationally represent the judgment of what constitutes a good Agricultural Education teacher program. It is this assumption that prompted the study of teacher preparation patterns in the Western Region of AAAE.

Purpose and Objective

The primary purpose of this study was to review the twenty-seven Agricultural Education programs in the Western Region in light of course requirements for a baccalaureate degree and certification in Agricultural Education.

The objectives of this study were to:

1. Identify the system under which the University/College operates, where Agricultural Education is administered and the number of faculty assigned.
2. Review the 20 four-year programs consisting of curricula and the 7 programs with five-year curricula to identify differences and similarities of the B.S. Degree and certification requirements.
3. Review the frequency and course content of professional education courses offered outside of Agricultural Education in relation to those professional education courses offered by Agricultural Education faculty.
4. Identify who administers and receives credit for student teaching administration and supervision.

Method and Procedure

The study was descriptive in nature and consisted of all twenty-seven Agricultural Education Departments/Units in the Western Region (continental U.S.). This study was conducted in the fall of 1992 with data collection by mail questionnaire. The survey instrument was reviewed and evaluated by Agricultural Education and College of Agriculture peers to determine content validity. An initial mailing of the questionnaire and cover letter was made to the head teacher educator of Agricultural Education in each institution and was followed by a telephone call to those who had not responded within the two weeks requested. Additional telephone calls were made to those respondents who still did not return questionnaires or where clarification was needed by the author.

The data were analyzed collectively by 4 and 5 year curricula using descriptive statistics including frequencies, percentages and means. All institutional credits were converted to a semester credit and open-ended questions provided qualitative data which were collected and listed according to the institution. Instruments were returned by all institutions queried.

Results

The Agricultural Education Departments/Units within the twenty-seven institutions in the Western Region were administered under four different systems that involved 4-year semester; 4-year quarter, 5-year semester and 5-year quarter arrangements (See Table 1).

Table 1. The System Under Which The College Operates.

	N	%
4-yr programs on a semester system	19	70.4
4-yr programs on a quarter system	5	3.7
5-yr programs on a semester system	3	11.1
5-yr programs on a quarter system	4	14.8
Totals	27	100

The survey showed that 16 of the 27 Agricultural Education Departments/Units (59.3%) are administered in the College of Agriculture and five (18.5%) in the College of Education (See Table 2 for detailed responses).

Table 2. Where Agricultural Education Departments/Units are Administered.

	N	%
College of Agriculture	16	59.3
College of Education	5	18.5
Jointly Administered (Ag & Ed)	2	7.4
College of Agriculture & Home Economics	1	3.7
School of Agriculture	1	3.7
Department of Agriculture	1	3.7
Jointly Administered (Ed and Arts & Sci.)	1	3.7
Totals	27	100

The number of faculty employed in the twenty-seven Agricultural Education Departments/Units varied from 1 to 6.25. Twenty-one or 77.8% of the respondents are in programs with 2 or less faculty or an average of 2.15 members assigned with only four programs with more than four faculty assigned to Agricultural Education. A complete presentation of the data is shown in Table 3.

Table 3. Faculty Assigned to Agricultural Education.

Number of Faculty	Number of Dept/Units Responding
1.00	10
1.50	4
1.75	1
2.00	6
2.40	1
3.50	1
4.00	2
5.15	1
6.25	1
$\overline{X} = 2.15$	27

The minimum number of credits needed to obtain a B.S. Degree in Agricultural Education ranged from 120 to 145 credits with a mean of 132.5 and a median of 132 for four-year institutions surveyed. The minimum B.S. Degree requirements for five-year institutions ranged from 120 to 132 with a of 127.6 and a median of 128 credits.

The minimum total credits required to complete a five-year program among the seven (7) programs ranged from 149 to 162 credits with a mean of 157.3 and a median of 158. It must be noted that differences existed within the seven-five-year curricula. These included a limited number of professional education courses during the fourth year or to professional courses offered only after the B.S. Degree was completed. Other differences showed programs offering only teaching credentials beyond a B.S. Degree while others received some graduate credits or met the requirements for a M.S. Degree.

The fifth year program offered students an opportunity to enroll for additional professional, technical and elective credits, as well as, further specialization. Increased remuneration when hired on the job was also a benefit in most instances because of additional credits or a M.S. Degree at five-year program institutions.

A closer examination of the curriculum reveals a further breakdown of courses into categories that represent general university requirements (core), technical agriculture requirements, professional education requirements and, professional agricultural education requirements. These are listed separately for the twenty institutions offering four-year programs and the seven institutions offering five-year programs and are summarized in Table 4 and Table 5.

Table 4. B.S. Degree and Certification for the Twenty Four-Year Programs in Agricultural Education.

Credits	Range	$\overline{X}$	Median
Core	18-63	44.75	48
Technical	37-58	50.30	50
Professional Ed	3-32	14.25	11
Professional Ag Ed	9-34	17.45	16
Total Professional (Ed, AgEd)	18-49	31.70	30
Student Teaching	6-16	8.95	9

From the preceding data one can identify areas where more opportunity is available to those students who are enrolled in five-year programs. Increased professional and technical courses, additional electives and specialization provide more experiences to student over those enrolled in four-year programs. However, the effect an additional year of study has on enrollments needs to be studied to see if there is a negative effect on ultimate number of teachers produced.

Table 5. B.S. Degree and Teacher Certification Requirements for the Seven Five-Year Programs in Agricultural Education.

Credits	Range	$\overline{X}$	Median
Core	34-56	45.07	48
Technical	36-60	52.42	54
Professional Ed	0-30	21.14	19
Professional Ag Ed	16-33	24.14	27
Total Professional (Ed, AgEd)	30-57	45.28	42
Student Teaching	10-18	12.71	12

Students majoring in Agricultural Education are required to take professional education from two major sources. They are:

1. Courses offered in professional general education and taught by faculty outside of Agricultural Education; and
2. Courses that are specifically designed for Agricultural Education graduates and are taught by Agricultural Education faculty.

In addition, two agricultural education disciplines were incorporated into a vocational education program with course offerings provided by faculty members in Vocational Education and also by an Agricultural Education faculty member. These courses were in addition to those courses required in general education.

The faculty representative from each of the twenty-seven institutions was then requested to list by course name and description all professional education courses required for teacher certification. These courses included both professional general education and professional agricultural education and are summarized in Table 6 and Table 7 respectively and are listed in descending order according to the number of times these specific courses are required as a part of the overall professional education curriculum requirement. The maximum number of responses did not exceed twenty-seven, or the number of institutions represented in this study.

Table 6. Required General Education Course for Certification.

	Program Course Requirements	
Course Title	N	%
Educational Psychology	22	81.5
Teaching Methods/Curriculum	16	59.3
Teaching Content Reading	14	51.9
Foundations of Education	13	48.1
Developmental Psychology	11	40.7
Teaching Practicum	9	33.3
Educational Measurement	8	29.6
Student Teaching	7	25.9
Secondary Schools/Society	7	25.9
Computer Technology	4	14.8
Professional Responsibilities	4	14.8
Guidance and Counseling	3	11.1
Seminars in Education	3	11.1
Media Technology	2	7.4
School Health	2	7.4
Middle School	1	3.7

Table 7. Required Agricultural Education Courses for Certification.

	Program Course Requirements	
Course Title	N	%
Teaching Methods	25	92.6
Student Teaching	22	81.5
Program Planning	21	77.7
SOEP/FFA	14	51.9
Vocational Philosophy	14	51.9
Pre-service AgEd	12	44.4
Curriculum Planning	8	29.6
Facility Planning	7	25.9
Instr. Aids/Tech. Comp	7	25.9
Pro-Seminar	6	22.2
Field Experiences	3	11.1
Special Problems	3	11.1
Research Methods	1	3.7
Cooperative Programs	1	3.7
Adult Programs	1	3.7

The five professional general courses that were most often required by the twenty-seven programs in Agricultural Education were Educational Psychology in 22 of the 27 curricula followed by Teaching Methods with 16, Teaching Content Reading - 14, Foundations of Education - 13, and Development Psychology - 11.

The five major courses in Professional Agricultural Education most often required are Teaching Methods in 25 of the 27 curricula, Student Teaching - 22, Program Planning - 21, SOEP/FFA - 14 and Vocational Philosophy - 14.

Student teaching is normally a cooperative arrangement between the institution's College of Education and the Agricultural Education programs. In spite of comments such as "they get the credit and we do the work" there does exist a political basis for cooperation because of state regulations and certification requirements. When the question was asked "Who administers student teaching?", it was found that 14 of the 27 programs (51.9% were administered by Departments/Units of Agricultural Education. The Department of Education and Agricultural Education programs jointly administered six programs involving student teaching as shown in Table 8 below.

Table 8. Administration of Student Teaching.

Department/Unit	N	%
Agricultural Education	14	51.9
Education	5	18.5
Jointly Administered (AgEd/Ed)	6	22.2
Vocational Education	2	7.4
Totals	27	100

Student credit hours were assigned somewhat differently. Agricultural Education received the credit recognition in seventeen instances followed by Education with five, Joint Agricultural Education/Education with three, and Vocational Education with two.

Conclusions

A typical western region Agricultural Education program is administered in the college of agriculture, offered on a semester basis and part of a 4 year curriculum. It is operated by a department or specialty group with two or less AgEd faculty members. It requires just over 132 semester hours for graduation. Students have few or no electives and extending the program to 5 years does not appear to significantly increase the amount studied in technical and core subject matter. University general education courses increased almost 50% and Agricultural Education courses increased approximately 6.7 credits or 2 courses in the 5 year program when compared to 4 year teacher preparation. Additional professional education course work in 5 versus 4 year programs was 13.6 credits and student teaching had almost 4 additional credits.

There are significant costs to additional years of university study. Without supporting empirical evidence, the advantages of a 5 year teacher education versus a 4 year teacher education program has not been demonstrated. Western regional AgEd programs reflect this judgment. There are significant pressures (Holmes Group and others) to increase the number of years and/or effect major modifications to current programs. AgEd teacher educators may often not have the opportunity to determine whether or not their program should be 4 or 5 years.

Limitations

There are several limitations to a study of this type. Two of the most significant are considered below. The first is the author's identification and categorization of professional education courses based on the course title and brief description. The second problem was the interpretation of the courses taken during the 4th and 5th years as being undergraduate, graduate or both in the five year programs from the information supplied. After several telephone contacts with professional Agricultural Educators from the respective institutions, the adjustments were made to assure that the data were as accurate as possible.

Importance of Study and Recommendations

Agricultural Education is undergoing change and in some institutions a major overhaul is taking place and in others, it should. Changes need to take place to eliminate course duplication, identify more appropriate technical requirements, and review education courses for content appropriate to Agriculture teachers.

This study showed that programs within the Western region do not differ to a great degree in relation to core courses, technical courses, student teaching and most program requirements. The area where most differences occur and where most concern takes place is the division and amount of professional general education requirements in relation to Agricultural Education requirements in the respective programs.

Continued research needs to be made to identify information on program planning, program delivery, program structure and other areas. These must be more appropriately shared among professional educators and other constituents at conferences and meetings in order to provide more dynamic and futuristic programs in the years ahead. More research is also needed to illuminate the nature of the undergraduate and graduate experience in the Colleges and Universities in the Western Region.

The increased difficulty to offer more courses in Agricultural Education because of increased general education credits required within a program with few or no electives has been of great concern to both Agricultural Education faculty and students.

It is recommended that states currently with 4 year programs begin to study teacher preparation following the B.S. in Agriculture degree or a Master's degree that would also certify an AgEd teacher. Change is certain. Those who have planned well or systematically "futured" Agricultural Education teacher preparation will be well placed and prepared to offer reasonable recommendations for their own future. Those who wait may suffer through directives and leadership of others who may not be beneficial to our program because of lack of support.

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AGRICULTURAL EDUCATION PREPARATION IN THE WESTERN REGION

A CRITIQUE

Discussant: Vernon D. Luft, University of Nevada

This was a study that reviewed twenty-seven Agricultural Education programs in the Western Region in light of their course requirements for a degree and certification. Most of us are interested in what is happening within our profession and teacher preparation. Therefore, this was an interesting study for me to read and review.

The introduction of the paper consisted more of editorialized comments than a documented theoretical framework. Only two references were cited in the paper, yet six citations are included on the reference list. When using APA style, one should not list references without citing them in the text unless the list is called a bibliography.

The purpose and objectives of a study should be defined when designing the research. The author's second objective referred to reviewing the 20 four year and seven programs with five year curricula. How did they know how many institutions have four and how many have five year programs when that was something that was determined in the study. It appears as though that objective was determined after the data were collected.

The data collection process resulted in the researchers obtaining a response from all institutions in the Western Region. They are to be commended for their persistence and thoroughness.

The results of the study were clearly presented in table form as well as explained in the narrative. I liked the way the authors provided a summary of the findings. The authors were also careful to point out limitations of their study.

It is always interesting to know how our individual Agricultural Education programs compare to others in our region. The study reveals there is considerable difference in requirements in agricultural education programs. The study also clearly points out that our programs are small in terms of faculty numbers. That being the case, how do we ever acquire enough clout in our universities to effect change that will be for the betterment of agricultural education programs?

I wish to thank the researchers of this study for the information provided, and commend them for their fine work.

A COMPARISON OF UNDERGRADUATE MAJOR AND PRESERVICE TEACHERS' PERFORMANCE ON A STANDARDIZED SUBJECT ASSESSMENT EXAM; AND TECHNICAL COMPETENCE AS PERCEIVED BY COOPERATING TEACHERS

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Introduction

In California there are two ways to earn a single subject teaching credential in agriculture. The first way is to complete a waiver program in one of the five universities approved by the Commission on Teacher Credentialing. Generally, this requires that the student receive an undergraduate degree in Agricultural Education. Although the degree requires that students take a few courses in Agricultural Education, basically it is a general degree in agriculture, that includes numerous courses in a number of technical areas. However, there are students who receive degrees in other subject areas and then take the necessary coursework required for the waiver.

The second way in which a student can obtain a single subject credential is to master a subject matter exam adopted by the Commission. The exam utilized is the Content Area Performance Assessment in Agriculture (CAPA) administered by the Educational Testing Service.

All students then must successfully complete a 45 unit program which includes student teaching. Those students who complete the waiver program mentioned above are ultimately required to master the CAPA to receive an Agricultural Specialist credential. The Agricultural Specialist credential is the type of credential that most school districts in California require prior to employing beginning teachers.

Is the technical undergraduate curriculum in agriculture appropriate for preparing secondary agricultural education teachers? For students who receive an undergraduate degree in one agricultural content area, is it adequate to allow them to teach in other content areas simply by scoring well on a standardized exam? These questions have long been concerns of teacher educators.

Theoretical Base

Two methods utilized to evaluate technical competence in agriculture include testing students and the cooperating teacher evaluation of technical competence. Although there have been a number of studies in the profession which have focused on teacher testing (Doerfert & Barrick, 1989; Jewell, 1989; Doerfert, 1990; Doerfert & Barrick, 1990; Jewell, 1991; Luft, 1993), such studies have generally focused upon the testing of basic competencies (reading, writing, or communication skills) or competencies associated with the understanding of the professional education component of the curriculum (knowledge of instructional execution and human development). Little research has been conducted to examine preservice teachers' knowledge of technical subject matter.

The accuracy of cooperating teacher evaluations of student teachers has been questioned. Researchers have found that leniency error (the tendency to rate too high on all items) often exits when cooperating teachers are asked to rate student teachers (Allison, 1978; Anastasi, 1982; Phelps, Schmitz, & Boatright, 1986; Baker & Hedges, 1990). In addition, a halo effect might also exist. A halo effect exists when cooperating teachers rate student teachers based upon an overall impression as opposed to specific traits (Wheeler & Knoop, 1982; Hattie, Olphert, & Cole, 1982; Phelps et al., 1986; Baker & Hedges, 1990).

Purpose and Objectives

The purpose of this study was to determine if differences existed between preservice teachers' undergraduate major in a post-baccalaureate credential program and their technical knowledge of agriculture. The following objectives provided focus for the study:

(1) Describe preservice teachers' in terms of undergraduate major, performance on the CAPA, and knowledge of subject matter as perceived by cooperating teachers, and

(2) Determine if differences existed between undergraduate major and student performance on the CAPA as well as their knowledge of subject matter as it was perceived by cooperating teachers.

Methods/Procedures

The methodology of this study will be described in terms of population, research design, instrumentation, data collection, and data analysis.

Population

The population for the study consisted of all students completing the agricultural credential program at California State Polytechnic University (Cal Poly, Pomona) between 1976 to 1992 (N = 130). A census of the population was used for the study.

Design of the Study

This study was descriptive-comparative in nature.

Instrumentation

Cooperating teachers were asked to complete an evaluation on student teachers at the conclusion of the student teaching experience. One portion of this evaluation involved their rating of the students' technical knowledge. A five point Likert-type scale was used in rating the students. The choices for the scale were: 1 = unsatisfactory, 2 = weak, 3 = satisfactory, 4 = strong, and 5 = outstanding. Reliability of the instrument was established using Cronbach's alpha coefficient of reliability. Reliability coefficients ranged from r = .70 to r = .75.

The CAPA was used to assess technical knowledge competence. The various categories included on the instrument were: (1) Agriculture and Society, (2) Animal Science, (3) Plant and Soil Science, (4) Agricultural Management, (5) Agricultural Mechanics, and (6) Agricultural Resource Management. Validity and reliability have been established for the standardized test which was utilized to collect this data by its author.

Data Collection

Data were obtained from departmental files and were collected during the Winter of 1993.

Data Analysis

Descriptive statistics were used to describe the population in terms of undergraduate major, performance on the CAPA, and cooperating teacher evaluations. Since Cal Poly, Pomona attracts preservice teachers that have obtained undergraduate degrees from the other universities across the state, the subjects used as the population for this study were considered as a slice of time sample of the target population of all preservice teachers in the state. Therefore, inferential statistics were used to ascertain significant differences between differing undergraduate majors. One-way ANOVAs were used to determine if differences existed between student major and CAPA performance and subject matter competence as perceived by cooperating teachers. The Duncan's Multiple Range test was used to determine specifically how the student major differed based upon CAPA performance and subject matter competence as was perceived by cooperating teachers. Data were analyzed using the SPSS/PC+ statistical software package.

Results

The initial research objective was to describe preservice teachers based upon undergraduate major, performance on the CAPA, and subject matter competence as perceived by cooperating teachers. Table 1 reveals that over one-half of the preservice teachers majored in Agricultural Education, and about one-quarter majored in Animal Science.

Table 1

Percentages of Undergraduate Major

	Number	Percentage
Animal Science	32	24.6
Ornamental Horticulture	16	12.3
Agricultural Education	71	54.6
Agronomy	8	6.2
Agricultural Business Management	3	2.3
Total	130	100.0

Of the 130 preservice teachers included in the study, CAPA results could only be located for 55 of the teachers. As reported in Table 2, preservice teachers performed best on the Agriculture and Society (80%), Animal Science (79.74%), and Agricultural Management (73.33%) portions of the CAPA. Their poorest performance was on the Agricultural Mechanics portion of the exam (46.97%).

Table 3 indicates that preservice teachers received their most satisfactory ratings from cooperating teachers in General Livestock (X = 3.97, SD = .82) and Ornamental Horticulture and Nursery (X = 3.94, SD = .82). The lowest ratings were in knowledge of Subtropical Horticulture (X = 3.63, SD = .72) and in Agricultural Mechanics (X = 3.69, SD = .80).

The final research question was to determine if differences existed between undergraduate major and student performance on the CAPA as well as their knowledge of subject matter as it was perceived by cooperating teachers. For the purpose of analysis, undergraduate major was recoded into the following categories: (1) Animal Science (n = 32), (2) Agricultural Education (n = 71), and (3) majors other than Animal Science and Agricultural Education (n = 27). Table 4 indicates that a statistically significant difference was found between performance on the CAPA Plant

Table 2

Means and Standard Deviations of CAPA Performance (N = 55)

	Total Possible	Mean Score	SD	Percent Correct
Agriculture & Society	15	12.00	7.66	80.00
Animal Science	35	27.91	10.01	79.74
Plant & Soil Science	45	27.98	6.80	62.17
Agricultural Management	15	11.00	4.85	73.33
Agricultural Mechanics	30	14.09	5.90	46.97
Ag. Resource Management	10	6.61	1.65	66.19

Table 3

Means and Standard Deviations of Technical Knowledge Competence as Perceived by Cooperating Teachers (N = 130)

	X	SD
General Livestock	3.97	0.82
Dairy Science	3.73	0.84
Poultry Science	3.75	0.73
Field Crops	3.81	0.65
Deciduous Fruits	3.82	0.78
Truck Crops	3.76	0.71
Subtropical Horticulture	3.63	0.72
Agricultural Mechanics	3.69	0.80
Ornamental Horticulture & Nursery	3.94	0.82

and Soil Science subsection of the test and undergraduate major (F = 3.99, p = .03). The Duncan's Multiple Range test revealed that Animal Science and Agricultural Education majors scored significantly lower on the subsection than the other majors.

Cooperating teacher evaluations were located for all of the preservice teachers included in the study. As indicated in Table 5, significant differences were found between technical competence as perceived by cooperating teachers and undergraduate major in the following areas: (1) General Livestock (F = 4.75, p = .01),

(2) Dairy Science (F = 4.21, p = .02), (3) Field Crops (F = 3.09, p = .05), and (4) Deciduous Fruits (F = 4.19, p = .02).

Cooperating teachers perceived Animal Science and Agricultural Education majors as being significantly more competent in General Livestock and Dairy Science than the other majors. In terms of Field Crops, cooperating teachers perceived that Agricultural Education majors were more competent than Animal Science majors. However, there was no significant difference between Agricultural Education majors in terms of Field Crops and Agronomy, Ornamental Horticulture, and Agricultural Business Management majors. Nor were differences found between Animal Science majors and Agronomy, Ornamental Horticulture, and Agricultural Business Management majors for Field Crops.

As for knowledge of deciduous fruit, cooperating teachers perceived that Agronomy, Ornamental Horticulture, and Agricultural Business Management majors were more competent than both Animal Science and Agricultural Education majors. Little differences were found between the ratings that Animal Science and Agricultural Education students received.

Discussion of Findings and Recommendations

In the following section, findings will be discussed and a comparison of similar studies will be made. After the discussion, recommendations will be forwarded.

Seventy-five percent of the preservice teachers received their B.S. either in Agricultural Education or Animal Science prior to entering the credential program. There were no Agricultural Engineering, Agricultural Biology, International Agriculture, or Soil Science majors that completed the credential program.

Table 4

Analysis of Variance of Undergraduate Major by Performance on CAPA Subsections (N = 55)

CAPA Subsections	Major[a]	n	X[b]	SD	F	p
Agriculture & Society	1	17	10.17	1.50	2.09	.13
	2	17	10.65	1.70		
	3	21	14.62	11.93		
Animal Science	1	17	29.35	4.07	1.00	.37
	2	17	25.06	4.15		
	3	21	29.05	15.28		
Plant & Soil Science	1	17	26.53[a]	5.80	3.99	.03
	2	17	31.65[b]	5.44		
	3	21	26.19[a]	7.59		
Agricultural Management	1	17	10.59	1.70	.24	.78
	2	17	10.77	1.99		
	3	21	11.62	7.57		
Agricultural Mechanics	1	17	13.82	3.73	.22	.81
	2	17	14.88	5.04		
	3	21	13.68	7.79		
Ag. Resource Management	1	17	6.35	1.77	1.40	.26
	2	17	7.19	1.28		
	3	21	6.38	1.77		

[a] Coded: 1 = Animal Science, 2 = Other, 3 = Agricultural Education

[b] Means with Differing Letters Differ Significantly at .05 Level

Preservice teachers' performance on the CAPA was also examined. Students performed best on the Agriculture and Society subsection of the CAPA, and poorest on the Agricultural Mechanics subsection. Although overall, cooperating teachers perceived the student teachers to be satisfactory in their technical knowledge, some

Table 5

Analysis of Variance of Undergraduate Major by Technical Competence as Perceived by Cooperating Teachers (N = 130)

Item	Major[a]	n	X^b	SD	F	p
General Livestock	1	32	4.21^a	.79	4.75	.01
	2	27	3.58^b	.74		
	3	71	4.00^a	.82		
Dairy Science	1	32	3.91^a	.83	4.21	.02
	2	27	3.34^b	.78		
	3	71	3.80^a	.82		
Poultry Science	1	32	3.66	.72	2.55	.08
	2	27	3.53	.75		
	3	71	3.87	.71		
Field Crops	1	32	3.57^a	.63	3.09	.05
	2	27	3.83^{ab}	.57		
	3	71	3.91^b	.67		
Deciduous Fruits	1	32	3.61^a	.73	4.19	.02
	2	27	4.17^b	.72		
	3	71	3.79^a	.79		
Truck Crops	1	32	3.70	.71	2.13	.12
	2	27	4.01	.69		
	3	71	3.70	.71		
Subtropical Hort.	1	32	3.55	.65	.90	.41
	2	27	3.79	.14		
	3	71	3.61	.74		
Agricultural Mechanics	1	32	3.69	.71	.02	.98
	2	27	3.71	.91		
	3	71	3.68	.80		
Orn. Hort. & Nursery	1	32	3.77	.70	2.60	.08
	2	27	4.24	.60		
	3	71	3.90	.92		

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[a] Coded 1 = Animal Science, 2 = Other, 3 = Agricultural Education

[b] Means with Differing Letters Differ Significantly at .05 Level

differences were found between the technical areas. The highest technical knowledge rating was in general livestock and the lowest ratings were in agricultural mechanics and subtropical horticulture. Although the issues of leniency error and halo effects were raised in the introduction of this paper, it should be pointed out that in this study, cooperating teachers successfully identified a content area in which student teachers were weakest in (agricultural mechanics) as identified by the CAPA.

Since less than one-half of the CAPA scores could be located for the 130 students included in the study, findings must be interpreted with caution. It was surprising that Animal Science undergraduate majors did not score significantly higher on the CAPA Animal Science subsection than the other majors. Could it be that the Animal Science subsection of the CAPA does not reflect what is taught in Animal Science classrooms? Perhaps the Animal Science majors did not prepare as thoroughly for the exam in their own content area. If this is the case, then it is puzzling that the category consisting primarily of Plant Science majors scored significantly higher on the Plant and Soil Science subsection of the CAPA.

The cooperating teacher ratings of the preservice teachers' seemed to send a mixed message when examined by undergraduate major. Animal Science majors were rated significantly higher on the Animal Science areas than were Agronomy, Ornamental Horticulture, and Agricultural Business majors with the exception of knowledge in Poultry Science. However, no significant differences were noted between majors when cooperating teachers rated preservice teachers in the Plant Science areas with the exception of knowledge in Deciduous Fruits.

As a result of the study, the following recommendations are forwarded:

(1) Teacher educators should work more closely with faculty in the areas of Agricultural Engineering, Agricultural Biology, International Agriculture, and Soil Science in an attempt to attract more students into the credential program in these subject areas.

(2) Preservice teachers performed poorest on the Agricultural Mechanics section of the CAPA and were rated lower in this area by their cooperating teachers. The state staff should examine closely the need for agricultural mechanics instruction in the state. There has been increasing dialogue regarding a change in the Agricultural Mechanics curriculum away from the more traditional wood and metallurgy to landscape irrigation science and horticultural equipment maintenance. If a need is identified, then courses should be required to enhance preservice teachers' skills. If a need does not exist, then this portion of the CAPA should be eliminated.

(3) When examining technical competence by undergraduate major, the CAPA and cooperating teacher ratings tend to be contradictory in some subject areas such as in Animal Science and Plant and Soil Science. Teacher educators should work much more closely with faculty in these disciplines to address this finding.

(4) Based upon the findings of this study, it is unclear how accuarate the cooperating teacher ratings were in determining technical expertise. Although the researchers believe that cooperating teacher evaluations provide an important outcome measure, additional research is needed to determine the degree of accuaracy of cooperating teacher evaluations.

(5) These findings should used as baseline data, and the study should be replicated in the other teacher education programs in the state in order to see if similar trends are observed.

(6) Curricula differences exist between instructors teaching the same course at the same university, as well as differences between universities. Subsequent studies should include both as variables as they relate to technical knowledge of preservice teachers.

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A COMPARISON OF UNDERGRADUATE MAJOR AND PRESERVICE TEACHERS' PERFORMANCE ON A STANDARDIZED SUBJECT ASSESSMENT EXAM; AND TECHNICAL COMPETENCE AS PERCEIVED BY MASTER TEACHERS

A CRITIQUE

Discussant: Vernon D. Luft

This study sought to determine if differences existed between preservice teachers' undergraduate major in a post-baccalaureate credential program and their technical knowledge of agriculture. The paper was well written in clear and concise fashion.

The research procedures followed, raises a couple questions for me. It was mentioned that agriculture teachers are prepared in one of five California institutions approved by the Commission on Teacher Credentialing. Data were collected by going to departmental files. It would be helpful to know what institutions were included in the study. Some data were collected by using the results of a student teaching evaluation instrument. Was the instrument standardized and the same for all five depanments? It was also reported that the reliability coefficients for that instrument ranged from .70 to .75. I would be somewhat concerned about the reliability being low.

The population studied consisted of 130 preservice teachers, yet only 55 Content Area Performance Assessment in Agriculture scores could be located. Why weren't the scores available? Was it perhaps because the test was not administered in earlier years? The span of years included in determining the population is sixteen. I would think that course requirements and content would change over that period of time and have an effect on scores being studied. Did the researchers think to analyze data by categorizing into years in which the preservice teachers completed their program?

The results of the study seem to be somewhat predictable. Using undergraduate majors as a means of comparing technical competence can be somewhat misleading. I feel it is important to know the content or requirements of the majors. Perhaps it would be more meaningful to make comparisons based upon the number of credits acquired in animal science, plant and soil science, agricultural mechanics, etc., as majors can vary.

Although the discussion of findings in this paper borders on being conclusions, I like to see conclusions singled out when reporting research. Otherwise, this was a well written paper.

Lastly, in addition to commending the authors for a fine research study, I'd like to raise an important question. How will the results of this study be used to benefit and/or improve agricultural teacher preparation in the five California institutions?

HOMEOWNERS' ATTITUDES ABOUT THE USE OF LAWN CHEMICALS

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Introduction

The environment is a critical, on-going concern to American consumers. It continues to rank among the top six consumer issues, along with quality of education, high medical costs, crime, drug and alcohol abuse and the AIDS problem. Furthermore, the intensity of this concern has been maintained. As of June 1990, about half of all consumers indicated they were more concerned about the environment than they were in 1989 (Hamlin, 1991).

Recent studies indicate that environmental action should take precedence over economic growth. According to Cambridge Reports (1989), "This willingness to sacrifice economic gain for the sake of the environment is evident across the board in qualitative studies on public attitudes about the greenhouse effect, air quality, and the use of pesticides" (p.1). The current state of the environment is more than a public issue; it has become a personal problem. In proprietary surveys majorities of consumers claim that their health has been affected by deteriorating environments, including the poor quality of drinking water and the poor quality of the air they breathe in the work place. In addition, research indicates that people are willing to sacrifice a wide selection of food in order to reduce the use of pesticides (Roberts,1986).

Commitment to preserving the environment is also evident in the tradeoffs

Americans are willing to make in order to avoid pesticide use. For example, a growing majority of Americans say they would pay higher prices to avoid pesticides in foods, and nearly seven in ten people now say they would put up with a smaller selection of foods for this purpose (Chou, 1991). The public's alarm and concern about the effects of pesticides on their own health is one of the primary catalysts now driving environmental activism. Polls show that it is this concern for human health, rather than preservation of nature, that is behind the recent surge of environmentalism (Hamlin, 1991).

For many years, an expanse of green, healthy lawns has been a valued part of a traditional American concept of a comfortable family home. More than 56 million Americans take part in their own lawn care (National Gardening Association, 1987-88). Lawns occupy an area estimated at between 25 million and 30 million acres, nearly 50,000 square miles or the size of the five New England states. The acreage of turfgrass coincides closely with population size. As the U.S. population continues to increase, so too will the turfgrass acreage (Roberts, 1986). With the development of inexpensive commercial fertilizers and pesticides, and rising household incomes in the post World War II era, the lawn care industry grew into a $1.5 billion enterprise.

Concern for human health risks resulted in tighter regulation of professional applicators at the state and local levels of government. Recognition of the contribution to water quality problems from lawn care practices has had a similar effect. Overall, the picture is one of increased concern about the effects of lawn chemicals by consumers. Over the past few years, there has been a corresponding decline in the use of lawn chemicals. What may be more significant is the growing proportion of consumers who say they never use any chemical based pesticide.

Another significant change in lawn chemicals usage are the reasons given by those using fewer chemical pesticides. While in earlier studies a sizable majority said they used less because of fewer problems and reduced need, the proportion giving that reason, reduced by half. There was a corresponding increase in the proportion citing environmental concerns and worry about personal safety (Hamlin, 1991).

This increased concern has resulted in new regulations being implemented to monitor pesticides. In the United States, new regulations governing lawn care practices have been introduced at both the state and local levels of government. They have generally taken the form of state-level restrictions on pesticides and local-level fertilizer restrictions. These new registrations require more data, and assurances that a pesticide will not cause unreasonable adverse health effects on the environment, humans and animals. This phase marks a shift towards recognition of potential chronic effects.

Increased regulation has been perpetuated by the recognition of the potentially adverse effects that improper pesticide use can have on soil, water, plant, and human ecosystems. Many of these chemicals are distributed in urban areas for use by the general public on lawns. According to Creason and Runge (1992), "to date, these nonagricultural uses have received relatively less scrutiny than farm uses. Yet, lawn chemical use in urban areas brings these products into closer contact with humans and animals than occurs in many farming areas. Urban landscapes are specifically designed to direct runoff into surface water systems through drains, gutters and storm sewers" (p. i).

Another regulation trend is the shift in scale from centralized to decentralized regulation (Creason & Runge, 1992). Responding to the general paralysis at EPA induced by re-registration burdens and reduced funding, many states and localities have begun enacting their own regulations. There are many examples across the United States. For example, in some states professional applicators are regulated by the state Department of Agriculture. Applicators must be trained and licensed, and equipment must be inspected periodically (Schmickle, 1991). Recently, some cities have also responded by regulating fertilizer applicators to post warnings after application.

Environmental issues, pesticide usage and restrictions, along with personalogical characteristics and ecological concerns all influence the attitudes of homeowners as illustrated in the conceptual framework (see Figure 1). The message for educators in agriculture is that understanding the concerns and attitudes of homeowners is imperative when planning educational programs that are designed to improve agricultural literacy. The alternative scenario is a public that influences policy without complete information.

Purpose and Objectives

The purpose of this study was to measure the attitudes of homeowners to determine how they feel and what they think about lawn chemicals. Specific objectives of the study were to:

1. Determine homeowners' attitudes about lawn care.

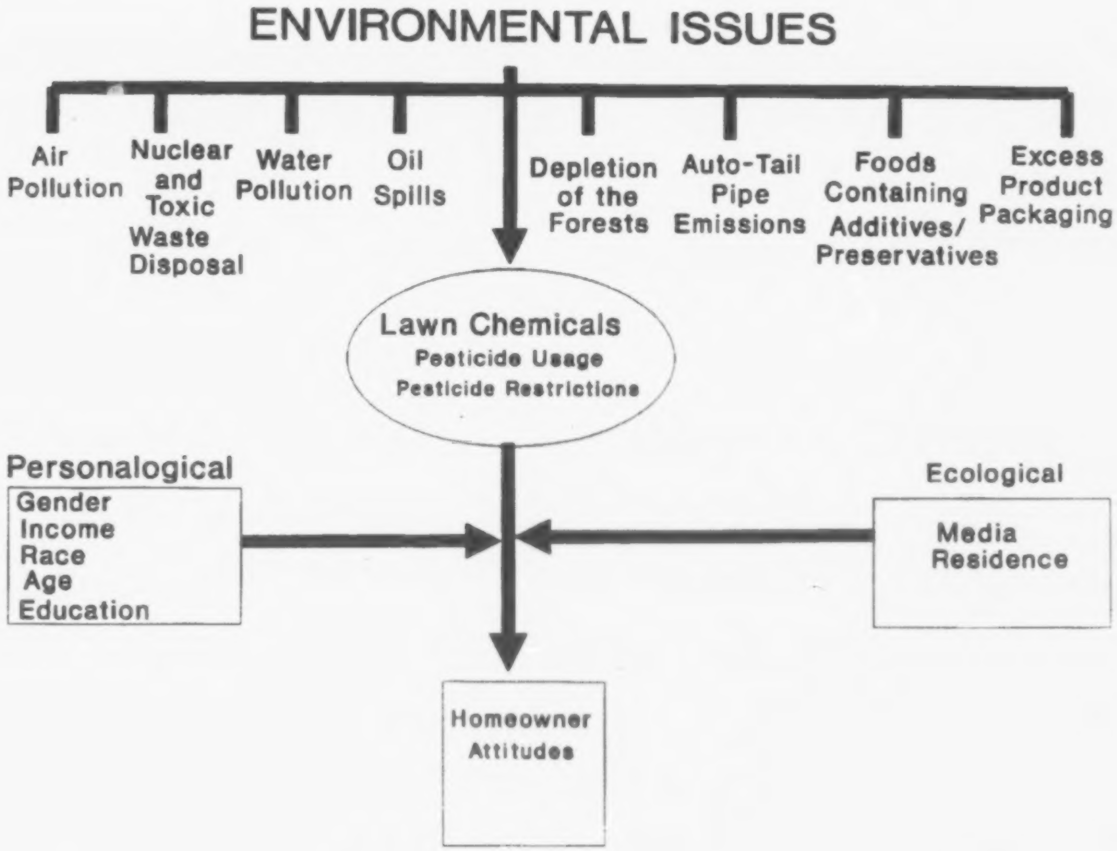
ENVIRONMENTAL ISSUES
Air Pollution
Nuclear and Toxic Waste Disposal
Water Pollution
Oil Spills
Depletion of the Forests
Auto-Tail Pipe Emissions
Foods Containing Additives/ Preservatives
Excess Product Packaging
Lawn Chemicals
Pesticide Usage
Pesticide Restrictions
Personalogical
Gender
Income
Race
Age
Education
Ecological
Media
Residence
Homeowner Attitudes

Figure 1. Conceptual Framework

2. Determine relationships between homeowners' attitudes on lawn chemicals and demographic data.
3. Determine relationships between homeowners' attitudes about proposed restrictions on lawn chemicals and demographic data.
4. Determine which media sources or other sources of information homeowners obtain their lawn chemical information.

The following research hypotheses were used in this study:

1. There are no differences in homeowner attitudes on lawn chemicals when compared with demographic data.
2. There are no differences in homeowner attitudes about proposed restrictions on lawn chemicals when compared with demographic data.

Procedures

The study used a descriptive survey component. The one shot case study design, utilized in this research, was used as a minimum reference point for guiding future research studies. Any appearance of absolute knowledge, or intrinsic knowledge about singular isolated objects, is found to be illusory upon analysis (Campbell & Stanley, 1963).

Instrument Development

In addition to an extensive review of literature, the focus group technique was used to develop the survey instrument. This involved eight specifically recruited respondents who were involved in a round table discussion directed by an experienced moderator. The focus group was held at on April 8, 1992 at a major university. Respondents were local chemical sales representatives, turf grass specialists and personnel from the Pesticide Education Center at the University. These individuals were selected based on their knowledge of lawn chemical use.

Due to the small size of the discussion groups and the screened recruitment process used, it should be noted that the focus group was only utilized to generate questions for the survey instrument.

Personal interviews with homeowners in residential areas were also used to develop the survey instrument. Homeowners were selected randomly from the phone book. Personal interviews were conducted the week of April 13, 1992 in 12 households in an urban area. Households were selected based on their geographic location and the fact that they had lawns. Participants discussed their awareness of pesticide use on lawns, the reasons they are used, and awareness of potential alternatives, such as mechanical, organic and biological methods of pest control. Attitudes were elicited, and respondents discussed awareness of pesticides used in and around their communities.

The Total Design Method (TDM) of conducting surveys (Dillman, 1978) was followed in all stages of the questionnaire construction and implementation process. A Likert-type scale with a five point range (1-strongly disagree, 2-disagree, 3-undecided, 4-agree, 5-strongly agree) was used in the questionnaire.

The instrument was checked for face validity by specialists in the area of lawn chemicals and pesticide education. The instrument was modified based on their recommendations. Content validity was established by a panel of experts familiar with lawn chemicals and instrument development. Changes were made according to the panel's recommendations.

Reliability of the instrument was established during a pilot test of homeowners who were not part of the sample population. The instrument had two primary constructs: a.) 27 statements on homeowners attitudes about lawn chemical use; b.) 8 statements on proposed restrictions about lawn chemicals. Reliability was calculated using Cronbach's Alpha. The coefficient was .75 for the section about attitudes about lawn chemical use, and .78 on proposed restrictions.

Population

The target population for the survey was all homeowners in the United States. The frame the sample was drawn from came from a direct mail house. The total number of homeowners in this frame was 85,977,458. Using Krejcie and Morgan (1970), the researchers determined a sample size of 384 homeowners to establish a 95 percent confidence level with a 5 percent sampling error. The sample population included 384 homeowners and 223 (58%) responded.

Non-response was controlled by the Total Design Method (Dillman, 1978). One week after the first mailing, a follow-up postcard was mailed to the sample population. Two weeks after the follow-up postcard, non-respondents were mailed a follow-up letter with a replacement questionnaire. Two follow-up mailings were sent to non-respondents with replacement questionnaires. No significant differences were found between early and late respondents, therefore, information in this research study can be generalized to the entire homeowner population (Miller & Smith, 1983).

Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS/PC+, 1987). Descriptive statistics were used to describe homeowners attitudes. Inferential statistics (correlations, regressions and ANOVA) were used to determine relationships and differences between selected groups. A 0.05 alpha level was determined a prior.

Results and Conclusions

Objective 1

1. Homeowners were undecided (3.04 average on 27 questions) concerning their attitudes toward lawn chemicals.
2. Homeowners disagreed with the statement that, "lawn chemical manufacturers do not sell lawn chemicals which would harm the environment." However, homeowners agreed with the statement that, "a healthy lawn provides a safe area for people in public parks," and "the benefits of a healthy lawn justify the use of lawn chemicals."
3. Homeowners were undecided (3.28 average on 8 questions) concerning their attitudes about proposed restrictions on lawn chemicals.
4. When homeowners were asked about their attitudes towards proposed restrictions on lawn chemicals they agreed with the statements that, "professional applicators who do lawn chemical spraying should be licensed" and "professional applicators should post signs after lawn chemical application until the chemical is dry or 24 hours after application." However, they

disagreed with the statement that "homeowners who do lawn chemical spraying should be licensed."

Objectives 2 and 3

5. No significant differences or important relationships were found for either objective.

Objective 4

6. Eighty-three homeowners indicated that there primary source of information was the newspaper. Eighty-one homeowners indicated that television was their second major source (see Figure 2).

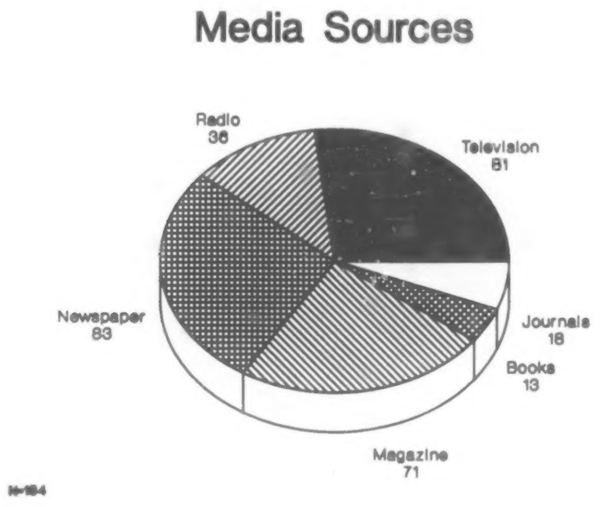

Figure 2. Media Sources

7. Eighty-nine respondents indicated that they receive a majority of their information from a lawn and garden store and 42 respondents listed friends as another major source of information (See Figure 3).

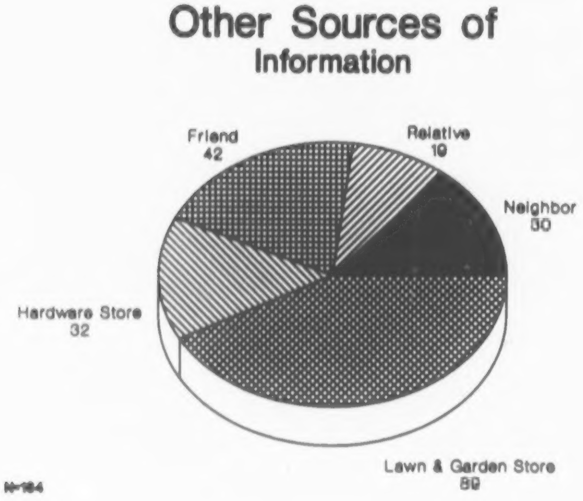

Figure 3. Other Sources of Information

Educational and Practical Importance of the Study

1. Because of homeowners' undecided responses concerning lawn care and proposed restrictions on lawn care, any information about lawn care has an opportunity to make an impact.
2. Educational programs may have to utilize non-traditional dissemination methods when presenting information about lawn chemicals. Homeowners did not identify teachers, schools, county extension agents, universities, libraries, or other traditional educational outlets as sources of information about lawn chemicals.
3. When preparing lawn chemical educational programs, it is advised that the issues raised in this study be addressed.

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HOMEOWNER'S ATTITUDES ABOUT THE USE OF LAWN CHEMICALS

A Critique

James E. Christiansen, Texas A&M University

This study is timely, of strategic and tactical importance to the profession, is well planned, reflects adequate research control, describes adequately the research procedures used, and addresses questions about which information is lacking. The study reveals that the educational channels to which we turn typically and traditionally to facilitate the adoption of approved practices may not be the most effective.

Although non-responses were considered (58% response rate), and there were no significant differences between early and late respondents, would it have been better to oversample considering the limitations of the Krejcie and Morgan formula and lack of knowledge of the representativeness of the source of direct mailing from which the sample was drawn?

The conceptual framework is clearly displayed. Could we attempt to portray our conceptual framework as clearly in more of the studies that we undertake? Was there a reason why no attempt was made, apparently, to determine the relative importance of media and non-media sources of information used by homeowners? Should this be done?

ENROLLMENT CHANGES IN IDAHO AGRICULTURAL SCIENCE AND TECHNOLOGY PROGRAMS WHICH OCCURRED AFTER PROGRAM DELIVERY CHANGES

Introduction

The decade of the 80's will be remembered as a time in the United States when widespread attention was focused on public school education. A plethora of national, special commission, and special task force reports surfaced all dealing with the shortcomings and inadequacies of our public school educational system and the subsequent effect on our society and the democracy. These reports served as a springboard for change. Agricultural education in the nation and Idaho experienced declining enrollments as education in the United States increased its focus on academics or "back to the basics." As a result, Idaho changed the delivery of secondary agricultural education.

Secondary agriculture programs cannot provide appropriate and relevant education in our schools without adequate student enrollment (Lierman, 1987). Without adequate numbers of students, the needs of the local and regional agricultural industries cannot be filled with qualified employees (Smyer, 1989). Zurbrick (1989) stated "It would certainly seem that the time was right to take a look at the total agricultural education program and make significant changes to meet the needs of our changing clientele" (p.3).

In 1989 Idaho's State Division of Vocational Education adopted curriculum changes for secondary agricultural education by dropping Vocational Agriculture I, II, III, and IV and replacing it with 35 agricultural science and technology semester courses. The change allowed education in and about agriculture to be more readily available to expanded numbers of students.

Changes were in response to the calls for change and more importantly to the declining enrollments being experienced by secondary agriculture programs in Idaho. Since 1986, the Idaho State Division of Vocational Education enrollment data (1992) indicated that a 60% increase in enrollment had occurred in Idaho secondary agricultural science and technology programs. However, no formal study had been done to describe the relationships of enrollment increases and FFA membership to program delivery system changes.

Purpose and Objectives

The purpose of this study was to describe delivery system and enrollment changes occurring after the 1989 Idaho secondary vocational agriculture program course delivery change and their relationship to Idaho agricultural science and technology programs.

The specific objectives of this study were to:

1. Describe the secondary agriculture program delivery systems currently being used in Idaho.
2. Describe changes in enrollment in Idaho's secondary agriculture programs from 1988 to 1992.
3. Describe the relationship between enrollment changes for Idaho's secondary agricultural science and technology programs and program delivery systems.
4. Describe the relationships between enrollment and delivery system change in Idaho secondary agriculture programs on total FFA membership in Idaho.

Methodology

The population for the study were the 84 Idaho secondary agriculture science and technology instructors in the 77 agricultural science and technology programs for the 1991-92 school year. Seventy-two programs in Idaho were single-instructor departments, four were two-instructor departments, and one was a three-instructor department. Each agricultural science and technology instructor was treated as an individual case and reported as a respondent.

The survey instrument questions were partially replicated from a study by Lierman and others (1988). The remainder of the questions were developed in cooperation with faculty in the Department of Agricultural and Extension Education at the University of Idaho. The instrument was pilot tested by six University of Idaho student teachers who were completing their student teaching experience. In addition, a panel of experts consisting of one high school principal and two experienced English teachers reviewed the instrument for readability.

The instrument was a self administered, mail questionnaire consisting of 28 questions. The format of the questions were yes/no, ranking, Likert-type scale, and open-ended completion questions. On the Likert-type scale a "1" represented greatly increased enrollment, "2" represented slightly increased enrollment, "3" represented no influence on enrollment, "4" represented slightly decreased enrollment, and "5" represented greatly decreased enrollment.

Data used were collected through the mail questionnaire and from records of the Idaho State Division of Vocational Education. Of the 82 active instructors who received the instrument, 78 (95%) returned usable instruments found to be of acceptable quality for inclusion in the study. Enrollment data were supplied by the Idaho State Division of Vocational Education from form 10-E and State FFA membership numbers were taken from the Idaho FFA official membership roster. Enrollment and FFA data from records in the Idaho State Division of Vocational Education were used because it appeared to be more consistent and comparable than what was gathered through the mail questionnaire.

The study was descriptive and used survey research methods. Variables and value labels were identified and entered into the Statistical Package for Social Sciences (SPSS 4.1) which was used to analyze data. Where possible, the information collected for this study was compared to that collected by Lierman, Beitia, and Riesenberg (1984).

Findings

Demographic data indicated that two new secondary agriculture programs had been added between 1988-1992. The number of schools utilizing a five-period day (tri-semester) increased by ten schools between 1988 and 1992. Eight periods on alternate days increased by three schools while the number of programs experiencing six, seven, and eight-period days appeared to remain constant from 1988 to 1992. The percentage of primarily rural schools had remained the same. Schools which were primarily urban increased from approximately 10% to 26% between 1988 and 1992, while a decrease of about 47% to 32% was reported in the number of schools which considered themselves both rural and urban.

Almost half of the agricultural science and technology instructors in Idaho had taught less than 11 years. The mean of all instructors was 12 years of experience. Instructors with three years of experience was the largest group in Idaho. The mean age of instructors in Idaho agricultural science and technology programs was 39 years.

The semester-based program delivery system was started in 1989. The number of traditionally delivered programs in Idaho had decreased from almost 63% in 1988 to 8% in

1992 (Table 1). Semester as a full year and semester programs had a noticeable increase from a combined 26% in 1988 to a combined 68% in 1992. Tri-semester programs also indicated an increase from 11% in 1988 to 22% in 1992.

Table 1

Delivery of Agricultural Science and Technology Programs

	Year			
	91-92*		87-88**	
Delivery System	Number of Respondents	Percent of Respondents	Number of Schools	Percent of Schools
Traditional	6	7.7	39	62.9
Semester as full year	24	30.8	6	9.7
Semester	29	37.2	10	16.1
Tri-semester	17	21.8	7	11.3
Other	2	2.5	--	--

* N=78 instructors in 72 programs

** N=63 data collapsed to number of schools (Lierman and others 1985)

Ninety-one percent of the respondents indicated they were using a semester-based delivery system in their programs and nearly 90% of the instructors described the delivery system as semester, semester as a full year, or tri-semester courses for their school. Six (7.7%) of the respondents still used the traditional method of Agriculture I, II, III, and IV for structure and delivery of the agricultural science and technology curriculum.

Approximately half (47%) of the agricultural science and technology instructors indicated they taught at least one non-reimbursed Idaho State Division of Vocational Education course and of these over half (54%) named junior high exploratory agriculture.

Thirty-six percent of the respondents reported that the applied science courses and 9% of the applied economics courses were used to meet credit needs for graduation. In 1988, 16% reported applied science credit and 3% reported applied economics credit were allowed for high school graduation. Curriculum areas perceived by Idaho agricultural science and technology instructors to have been quite influential on student enrollment were: agricultural mechanics, leadership/FFA, and animal science. The least influential area of the curriculum was identified as the Supervised Agricultural Experience Program (SAEP).

The agricultural mechanics classes (Table 2) were reported to be the most frequently taught semester-based courses. Sixty-five of the 78 respondents indicated they taught agricultural welding, 51 indicated agricultural fabrication, 44 indicated introduction to agricultural mechanics, and 40 indicated small gas engines. Those four class enrollments comprised approximately 32% of the total reported enrollment. The five introductory courses were the next most frequently taught semester-based courses.

Table 2

Ranking of Courses Taught in Idaho by Frequency

Rank	Course Number	Course Taught	Number of Respondents	Percent of Respondents	Number of Students	Percent of Enrollment
1.	210	Agric. Welding	65	83.3	1444	12.5
2.	240	Agric. Fabrication	51	65.4	729	6.3
3.	110	Intro to Agric. Educ.	45	57.7	1081	9.4
4.	130	Intro to Agric. Mech.	44	56.4	808	7.0
5.	221	Small Gas Engines	40	51.3	802	6.9
6.	140	Intro to Livestock Industry	37	47.4	706	6.1
7.	120	Intro to Agric. Industry	35	44.9	926	8.0
8.	230	Agric. Structures	29	37.2	429	3.7
9.	310	Applied Livestock Mgmt.	24	30.8	321	3.6
9.	150	Intro Agric. Plant Ind.	24	30.8	306	2.7
11.	510	Plant & Soil Science	20	25.6	425	3.7
11.	220	Agric. Power Technol.	20	25.6	290	2.5
13.	340	Appl. Greenhouse & Nurs.	19	24.4	272	2.4
13.	460	Agric. Bus. Mgt. & Mkt.	19	24.4	167	1.4
15.	530	Animal Science	15	19.2	298	2.6
15.	330	Landscape Design	15	19.2	257	2.2
15.	410	Personal Skill Dev.	15	19.2	234	2.0
15.	660	Agric. Bus. & Economy	15	19.2	190	1.6
15.	222	Agric. Power Lrg. Eng.	15	19.2	183	1.6
20.	512	Sci. Plant Growth & Dev.	13	16.7	380	3.3
21.	514	Horticultural Plant Science	11	14.1	192	1.7
22	350	Forest and Wildlife Mgmt.	11	14.1	144	1.3
23.	320	Applied Crop Mgmt.	8	10.3	87	0.75
24.	532	Science Animal Nutrition	7	9.0	123	1.1
24.	227	Agric. Machinery	7	9.0	98	0.85
24.	225	Agric. Sys./Elec. & Hyd.	7	9.0	95	0.82
27.	520	Natural Resource Science	5	6.4	117	1.0
27.	420	Occ. & Career (COE)	5	6.4	33	0.29
29.	534	Science of Animal Repro.	4	5.1	80	0.69
29.	Other	1 ***	4	5.1	75	0.65
31.	422	Occ. & Career (SAE)	3	3.9	86	0.74
32.	Other	2 ***	2	2.6	47	0.41
32.	536	Fish & Wildlife Science	2	2.6	6	0.05
34.	518	Range Science	1	1.3	22	0.19
35.	335	Floriculture	0	–	0	–
36.	516	Forestry Science	0	–	0	–
37.	540	Biotech./Ag. Applic.	0	–	0	–
			Total: 78*		Total: 11,563**	

* Instructors Reporting 72 programs out of 77

** Duplicated class enrollment for 78 instructors from possible 84

*** Not identifiable

It appeared that 33% of the reported enrollment was in an introductory course. Introduction to agricultural education was taught by 45 of the respondents and made up 9% of the reported enrollment. The respondents indicated science courses were the least frequently taught, with approximately 14% of the reported enrollment.

The semester-based program delivery system was started in 1989. From the time of the delivery system change, there had been an increase of 2,220 students or approximately 48% (Table 3). State FFA association membership decreased as a percent of enrollment from 74% in 1988 to 49% in 1992. Seventy-two of the 77 chapters reported a total of 403 more FFA members than were on the complete 1991-92 official state FFA membership roster. This appeared to have been a 12% increase in reported membership compared with actual state membership.

Table 3

Secondary Agriculture Enrollment FFA Membership

Year	SDVE* Enrollment	FFA** Membership	Percent FFA Membership
1987	4211	3365	79.9
1988	4663	3465	74.3
1989	4880	3451	70.7
1990	5296	3444	65.0
1991	5938	3225	54.3
1992	6883	3399	49.4

* State Division of Vocational Education Form 10-E Reports
** Official State Membership Roster

Nearly 67% of the respondents indicated an increase in their agricultural science and technology program enrollment. Approximately 47% of the Idaho agricultural science and technology instructors reported total program enrollment increased 5% to 24%. The number of females enrolled in secondary agricultural science and technology programs more than doubled from 801 in 1988 to 1,655 in 1992. Four (5%) of the instructors reported a decrease in enrollment since 1989. Open entry/open exit, more varied courses increased interest toward agriculture and science credit were perceived as possible positive reasons for an enrollment change. Class conflicts in scheduling was seen as a negative reason for enrollment change.

More than 40% of the respondents indicated FFA membership was unchanged in their department for the previous three years. Almost 37% of the instructors reported FFA membership had increased, while 19% reported FFA membership in their program had decreased. Possible positive indicators for change in FFA membership included an increase in program enrollment and increased chapter activity. The only indications given for a decrease in percent of FFA membership were less student contact by 12% of the respondents and program enrollment decline by 6% of the respondents.

Conclusions and Recommendations

Major conclusions reached from the findings of this study were:

1. Idaho agricultural and science technology program enrollment had increased by 48% from 1988 to 1992. This may have been due, among other factors, to greater student access to more varied courses offered in an open entry/open exit structure, increased interest in agriculture, and science credit for agricultural courses.

2. FFA membership had decreased as a percent of total program enrollment from 74% in 1988 to 49% in 1992. This could have been due, among other factors, to less student contact and local FFA members dues not remitted for inclusion on the Idaho official FFA membership roster.
3. Agricultural mechanics courses were the most frequently taught and agricultural science courses were the least frequently taught curriculum areas of the Idaho agricultural science and technology program.
4. Ninety-one percent of the Idaho agricultural science and technology instructors had revised their program to a semester-based delivery system.
5. Approximately half of the Idaho agricultural science and technology instructors taught a non-vocational course, and over half of these indicated it was junior high exploratory agriculture.
6. High school graduation credit for agricultural science and technology courses were not well understood by the instructors. Additional research should be conducted to determine why students who are enrolled have not joined the FFA and to determine how the continuity and effectiveness of traditional programs can be incorporated into the semester-based delivery system.

Considering the findings and insights gained from this study, the following recommendations were made:

1. Changes in program enrollment need to be monitored closely as Idaho secondary agricultural education moves further into the semester-based delivery system.
2. As program enrollment increases, FFA membership and reporting of membership must be

monitored more closely and actions taken, where needed, to reverse the current trend of decline.

3. Curriculum for junior high exploratory agriculture courses should be developed and vocational funding for these courses explored.
4. Idaho agricultural science and technology instructors, the State Division of Vocational Education, and the University of Idaho need to explore avenues to certify teachers in the approved curriculum areas of science and consumer economics.
5. Idaho agricultural science and technology instructors need to work closely with counselors and administrators in understanding credit granted for their courses, reducing scheduling conflicts, and recruitment of quality students.
6. Idaho agricultural science and technology instructors must continue to discuss issues facing the profession and remain proactive in the process of change.

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ENROLLMENT CHANGES IN IDAHO AGRICULTURAL SCIENCE AND TECHNOLOGY PROGRAMS WHICH OCCURRED AFTER PROGRAM DELIVERY CHANGES

A Critique

James E. Christiansen, Texas A&M University

This study is timely, of strategic and tactical importance to the profession, is well planned, reflects adequate research control, describes adequately the research procedures used, and addresses questions about which information is lacking. The study establishes a pattern for similar studies that are needed in states, such as Texas, where the secondary agricultural science curricula also consist of many semester-long courses.

Were the teachers who did not participate in the study contacted to solicit their assistance? (the study was of the population) Were any of the instructors who reported a decrease in enrollment since 1989 instructors who were still using the traditional AG I, II, III, and IV curriculum?

AGRICULTURAL MECHANICS LABORATORY SAFETY: STUDENT ATTITUDES AND PERCEPTIONS

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INTRODUCTION AND THEORETICAL FRAMEWORK

Accident rates and health problems associated with secondary agricultural science programs are shocking. Results of a study of agricultural science programs in Texas show that in 239 randomly selected schools, 1449 accidents had occurred (Lawver, 1992). Of the programs studied, one Texas Agricultural Science and Technology teacher reported 13 major accidents during a five-year period. Studies by Bekkum and Hoerner (1993) in Iowa and Silletto (1993) in Nebraska found similar accident rates. Bekkum and Hoerner reported means of 7.70 minor accidents and 0.66 major accidents over a five year period. In Nebraska, Silletto found a mean minor accident rate of 8.58 and a mean major accident rate of 0.75. In a study of agricultural science programs in the state of Virginia, Burke (1989) reported 954 accidents in programs surveyed for a one-year period. Gartin, Maines, and Bean (1993) in a study of West Virginia agricultural science programs, found that 89 responding teachers reported 49 accidents involving equipment commonly found in agricultural mechanics laboratories over a one year period.

The National Safety Council (NSC) (1988) reported that about 19,200 accidents occurred in vocational-industrial arts laboratories for the academic years of 1984-85 and 1985-86. Firenze and Walters (1981) suggested the number of injuries in schools would actually be much higher due to non-reporting of accidents. It is typical for accidents which do not result in property damage or loss of at least one-half day of school to go unreported. The data reported by the NSC are not categorized by educational division (vocational vs. industrial arts); thus, it is impossible to ascertain the number of injuries related to agricultural science.

Harper (1983), Westrom and Lee (1990), Miller (1990), Hard and Miller (1990), Fletcher and Johnson (1990), Bekkum and Hoerner (1993), Hilton and Bruening (1993), Gartin, Maines, and Bean (1993), Gliem, Miller, and Hard (1993) and others have addressed agricultural mechanics laboratory safety and related health risks in recent research efforts. Safety and compliance with basic safety standards has been a concern since the inception of the agricultural education programs. True efforts to enforce compliance with safety standards came from the federal government with the passage of the William-Steiger "Occupational Safety and Health Act of 1970" (OSHA Act). This law was passed to assure safe and healthful working conditions for working men and women. The Act established the National Institute for Occupational Safety and Health (NIOSH) in the Department of Health, Education, and Welfare and the Occupational Safety and Health Administration (OSHA) in the Department of Labor. The Act provided for research, education, information programs, and training in the field of occupational safety and health and authorized the enforcement of standards. However, since schools generally are not classified as a place of work or businesses and students are generally not recognized as employees, complete compliance with NIOSH and OSHA regulations in most states has been questionable. Enforcement of safety regulations is generally left to local school districts and state departments of education. Many agricultural science programs have seen safety standards as a nuisance and an infringement on academic freedom.

The study by Lawver (1992) shows that accident rates are excessive and that safety should be a concern in Texas Agricultural Science Laboratories. The benefit of this research is that the data collected will help to begin to understand why accident rates are so high. By examining relationships between accidents and safety attitudes and perceptions of students, we can target intervention efforts more effectively. Is the Agricultural Education profession doing all that should be done in promoting safe behaviors? What factors can be extracted from the student's safety attitudes and perceptions to help discover relationships? Safety in secondary agricultural science laboratories is an issue for students and teachers.

PURPOSES AND OBJECTIVES

The purpose of this study was to fulfill a need for data regarding factors which comprise the attitudes and perceptions of students concerning safety in Texas agricultural mechanics laboratories. In addition, the relationships between accidents and safety attitudes and perceptions of students were investigated. Specific objectives were as follows: (1) To identify factors associated with student safety attitudes and perceptions. and (2) To determine relationships between the extracted factors and incident of injury or involvement in serious accident.

METHODS AND PROCEDURES

The target population for this descriptive-relational study was all Texas Agricultural Science and Technology programs for the 1992-1993 academic year and all students enrolled in secondary agricultural mechanics courses during the same period. It was anticipated there would be approximately 1000 Agricultural Science and Technology programs and 20,000 students who were enrolled in agricultural mechanics courses in Texas for 1992-1993. Due to limited resources, the researcher elected to limit the sample to 30 randomly selected programs and the students enrolled in agricultural mechanics in those programs. With intensive follow-up procedures, a return rate of 87% (n=26) was achieved. Three-hundred-seventy-eight student questionnaires were returned.

The teacher in each of the 30 programs was asked to administer the student questionnaire. The student questionnaire was designed for response on a machine readable form and consisted of four sections. Section one contained 20 Likert-type items dealing with attitudes and perceptions about general safety behaviors. Fifteen Likert-type items designed to assess students attitudes and perceptions concerning safety behavior and knowledge of their teacher and general safety condition of the agricultural mechanics laboratory made up section 2. Section 3 was designed to assess attitudes and perceptions concerning parental safety knowledge and behavior and safety conditions of the home. There were 15 Likert-type items in section 3. Section 4 consisted of 5 closed-ended questions about home town, personal involvement in serious accidents, instruction in safety, and personal involvement in accidents in the agricultural mechanics laboratory. Faculty and graduate students reviewed the instrument for face and content validity. The Cronbach's alpha reliability coefficients for sections 1, 2, and 3 were 0.70, 0.76, and 0.89 respectively.

After the 30 programs were randomly selected, each was contacted by telephone to ascertain willingness to participate in the study. One replacement was randomly selected to replace one program whose teacher was not willing to participate. The number of students eligible to complete the questionnaire was also determined with the phone call. Packets containing student questionnaires, machine readable forms, and a stamped returned envelope were mailed. After two weeks and three weeks, non-respondents were called to remind them to complete and mail the questionnaires. A replacement package was mailed to one program. Early and late respondents were compared. No significant differences were found.

The data were analyzed using SPSS ® for the Macintosh®. Objective 1 was achieved with factor analysis using the principal components method with orthogonal rotation. According to Kim and Mueller (1978), a scree test can be used to determine the number of factors to be extracted. Items were grouped into three factors for section 1, three factors for section 2, and two factors for section 3. Items with a loading of less than .40 were eliminated. Point-biserial correlation coefficients and stepwise multiple regression were used for Objective 2. The magnitude of relationships were interpreted using Davis' (1971) conventions. An alpha level of .05 was set a priori.

FINDINGS

Objective 1. Since the questionnaire was divided into four distinct sections, it was decided to treat each of the three individual Likert-type sections separately for the purpose of factor analysis. Section 1 dealt with attitudes and perceptions about general safety behaviors. Three factors were extracted for section 1. Upon examination of factor loadings and the items which loaded on the factors, each of the three factors were named. The factors were named as follows: Factor 1 - Student Negative Safety Attitude; Factor 2 - Student Positive Safety Attitude; and Factor 3 - Inconvenient Safety Practices. Table 1 contains the items in each factor and the loading for each. The items which loaded on Factor 1 are statements which a person might make if they held negative attitudes toward safety. Factor 2 is comprised of statements which would be typical of students who held positive safety attitudes. The two items in Factor 3 are typical statements of someone who may see the benefit of safety practices and yet think of those safety practices as a nuisance.

TABLE 1. Means, Standard Deviations, and Factor Loadings of Items Associated with Student's Personal Attitudes and Perceptions **(n = 377).**

Factor/ Item	Mean[a]	Std. Dev.	Factor Loading
Factor 1 - Student Negative Safety Attitude			
Safety does not interest me	1.23	1.43	.73
Safety is not my responsibility	1.00	1.39	.70
Teachers spend too much time teaching safety	1.77	1.51	.67
Safety is for beginners only	1.22	1.44	.66
Safety education is a waste of time	1.19	1.36	.62
There are too many safety rules	1.75	1.41	.60
I don't care if my fellow class mate is unsafe	0.98	1.30	.60
Safety is for schools, not businesses	1.13	1.32	.58
Safety does not benefit the student	1.07	1.33	.58
Using personal safety equipment is a waste of time	1.10	1.35	.49
Factor 2 - Student Positive Safety Attitude			
Handling chemicals in a safe manner is important	4.02	1.21	.79
Knowledge of hand and power tool safety procedures is important	3.96	1.20	.74
Knowing what to do if an emergency happens is important	4.25	1.16	.73
Safety is important	4.31	1.01	.72
Safety makes sense	4.40	1.03	.62
Safety rules are a good idea	4.08	1.34	.58
Everyone should follow safety rules	4.24	1.06	.58
Using correct agricultural mechanics safety practices is important	3.84	1.24	.57
Factor 3 - Inconvenient Safety Practices			
Safety guards make things hard to operate	1.93	1.39	.86
Safety rules make things hard to operate	1.74	1.35	.77

[a] 0=Very Strongly Disagree; 1=Strongly Disagree; 2=Disagree; 3=Agree; 4=Strongly Agree; 5=Very Strongly Agree.

Section 2 of the questionnaire dealt with students perceptions of their teacher's safety behavior and the condition of the agricultural mechanics laboratory. Three factors were extracted for section 2. Upon examination of factor loadings and the items which loaded on the factors, each of the three factors were named. The factors were named as follows: Factor 4 - Teacher Safety Conscious; Factor 5 - Teacher Careless; and Factor 6 - Condition of Laboratory. Table 2 contains the items in each factor and the loading for each. The items which loaded on Factor 4 are statements that would be typical of a student who perceived their teacher to be safety conscious and skilled at operating tools and machinery in a safe manner. Factor 5 contains items which would be typical of students whose teacher was careless. The items which loaded on Factor 6 address the condition of the agricultural mechanics laboratory.

***TABLE 2. Means, Standard Deviations, and Factor Loadings of Items Describing Student's Attitudes and Perceptions Toward Their Teacher's Safety Behavior* (n = 377).**

Factor/ Item	Mean[a]	Std. Dev.	Factor Loading
Factor 4 - Teacher Safety Conscious			
My teacher follows safe practices	3.90	1.21	.81
My teacher considers safety to be important	4.17	1.17	.80
My teacher puts safety first	3.91	1.18	.78
My teacher stresses safe student behavior	4.00	1.16	.78
My teacher knows how to handle materials in a safe manner	3.91	1.20	.66
My teacher knows how to operate power tools in a safe manner	4.04	1.10	.63
My teacher knows how to operate machinery in a safe manner	3.92	1.23	.57
Factor 5 - Teacher Careless			
My school laboratory is a dangerous place to work	1.54	1.57	.73
My teacher sometimes does unsafe things in the laboratory	1.61	1.10	.70
My teacher is careless	1.09	1.49	.67
My teacher knows little about safety practices	1.17	1.43	.63
My teacher teaches unsafe practices	0.98	1.28	.62
Factor 6 - Condition of Laboratory			
My school's laboratory tools are safety color coded	2.94	1.46	.79
My school's power equipment is kept in safe working condition	3.54	1.27	.66
My school's laboratory tools are sometimes in an unsafe working condition	2.01	1.45	-.59

[a] 0=Very Strongly Disagree; 1=Strongly Disagree; 2=Disagree; 3=Agree; 4=Strongly Agree; 5=Very Strongly Agree.

The safety behavior and safety conditions of the home were addressed in section 3 of the questionnaire. Two factors were extracted for this section. Upon examination of factor loadings and the individual items the factors were named as follows: Factor 7 - Parent Safety Conscious; and Factor 8 - Parent Careless. Table 3 contains the factors for section 3 of the questionnaire. The items which loaded on Factor 7 were statements that would be typical of students whose parents and home environment was safe. Factor 8 contained items typical of students who have parents that are careless or who live in unsafe conditions.

TABLE 3. Means, Standard Deviations, and Factor Loadings of Items Describing Student's Attitudes and Perceptions Toward Their Parent's Safety Behavior (n = 377).

Factor/ Item	Mean[a]	Std. Dev.	Factor Loading
Factor 7 - Parent Safety Conscious			
My parents know what to do in case of an emergency	3.77	1.36	.78
My parents put safety first	3.41	1.26	.77
My parents consider safety to be important	3.75	1.26	.76
My parents follow safety practices	3.52	1.23	.75
My family's motor vehicles are in safe working condition	3.78	1.34	.69
My house is a safe place to live	3.76	1.32	.68
My parents know how to drive a care safely	3.86	1.31	.67
My parents know how to operate equipment in a safe manner	3.45	1.32	.67
My parents know how to handle dangerous substances	3.45	1.25	.52
Flammable materials around my home are stored in a safe manner	3.44	1.32	.49
Factor 8 - Parent Careless			
My parents are sometimes careless	2.43	1.36	.82
My parents don't always follow safety warnings	2.27	1.34	.78
My parents have little knowledge of safety practices	1.77	1.54	.46
The dangerous materials in my home are stored in an unsafe manner	1.80	1.51	.45

[a] 0=Very Strongly Disagree; 1=Strongly Disagree; 2=Disagree; 3=Agree; 4=Strongly Agree; 5=Very Strongly Agree.

Objective 2. On section four of the questionnaire, students were asked about their experiences with injuries in the agricultural mechanics laboratory and involvement in serious accidents in a variety of situations. Of the 377 respondents, 50 (13.2%) indicated they had been injured in the agricultural mechanics laboratory. Nearly 54% (n = 203) had been involved in a serious accident of any kind. Twenty-nine (7.7%) indicated that they had been involved in a serious accident at school. Serious auto accidents were reported by 10.5% (n = 39); serious job related accidents were reported by 5.8% (n = 22); and serious recreational accidents were reported by 17.4% (n = 66) of the respondents. Only injury in the agricultural mechanics laboratory, involvement in any serious accident, and involvement in a serious accident at school showed statistically significant relationships with any of the extracted factors. Table 4 shows the point-biserial correlation coefficients for these associations.

Stepwise multiple regression analysis was used to determine the amount of variance explained by the extracted factors. For the dependent variable, "injured in the agricultural mechanics laboratory," two factors entered the multiple regression equation. Factor 2 - Student

Positive Safety Attitude accounted for 10% of the variance. An additional 3% was accounted for by Factor 5 - Teacher Careless (see Table 5). As seen in Table 4, there was a negative low association between Factor 2 and incidence of injury in the agricultural mechanics laboratory. Also, there was a positive low association between the perception that the agriculture teacher was careless and the incident of injury. Students who had been injured in the agricultural mechanics laboratory tended to have less positive safety attitudes and tended to perceive that their teacher was careless.

TABLE 4. Point-Biserial Correlation Coefficients by Accident and Factor Scores **(n = 377).**

Variables	Injured in Ag.Mech. Lab.[a]	Involved in Any Serious Accident[a]	Involved in Serious Accident at School[a]
Factor 1 - Student Negative Safety Attitude	.25**	.11*	.12*
Factor 2 - Student Positive Safety Attitude	-.30**	-.10	-.17*
Factor 3 - Inconvenient Safety Practices	.14**	.12*	.03
Factor 4 - Teacher Safety Conscious	-.27**	-.13*	-.13*
Factor 5 - Teacher Careless	.27**	.22**	.14**
Factor 6 - Condition of Laboratory	-.01	-.05	-.05
Factor 7 - Parent Safety Conscious	-.23**	-.18**	-.14**
Factor 8 - Parent Careless	.15**	.19**	.17**

[a] Coded 0 = no injury or no involvement in serious accidents; 1 = injury or involvement in serious accidents.

* $p \leq .05$

** $p \leq .01$

A multiple regression equation was computed with involvement in a "serious accident at school" as the dependent variable. Table 5 shows that Factor 2 - Student Positive Attitude explained 3% of the variance. Factor 8 - Parent Careless contributed another 1% of the variance. The point-biserial correlation coefficients (Table 4) show that there was negative low association between Factor 2 and involvement in a serious accident at school and positive low association between Factor 8 and involvement in a serious accident at school. Students who indicated they had been involved in a serious accident at school tended to have less positive safety attitudes and tended to perceive their parents as being careless.

The dependent variable, involvement in "any serious accident" was examined with the final stepwise multiple regression equation. As shown in Table 5, Factor 5 - Teacher Careless explained 5% of the variance while Factor 8 - Parent Careless explained an additional 1% of the variance. Table 4 shows there were positive low associations between Factor 5 and involvement in any serious accident and between Factor 8 and involvement in any serious accident. Students who were involved in any serious accident tended to perceive that their teacher was careless and that their parents were careless.

TABLE 5. Stepwise Multiple Regression Analysis of Factors on Injury and Accident Involvement **(n = 377).**

Dependent Variable/ Independent Variable	R	R^2	R^2 Change	df	F
Injured in Ag Mechanics Lab					
Factor 2 - Student Positive Safety Attitude	.31	.10	.10	(1,358)	39.29*
Factor 5 - Teacher Careless	.36	.13	.03	(2,357)	26.68*
Serious Accident at School					
Factor 2 - Student Positive Safety Attitude	.16	.03	.03	(1,356)	9.20*
Factor 8 - Parent Careless	.20	.04	.01	(2,355)	7.30*
Any Serious Accident					
Factor 5 - Teacher Careless	.22	.05	.05	(1,356)	18.23*
Factor 8 - Parent Careless	.25	.06	.01	(2,355)	11.52*

* $p \leq .05$

CONCLUSIONS AND RECOMMENDATIONS

For the three Likert-type sections of the questionnaire, eight factors were extracted using the principal-components method with orthogonal rotation. These factors appear to be distinct when examining the factor and the factor loadings. The eight factors were named: Factor 1 - Student Negative Safety Attitude; Factor 2 - Student Positive Safety Attitude; Factor 3 - Inconvenient Safety Practices; Factor 4 - Teacher Safety Conscious; Factor 5 - Teacher Careless; Factor 6 - Condition of laboratory; Factor 7 - Parent Safety Conscious; and Factor 8 - Parent Careless.

Point-biserial correlation coefficients did show low relationships between some of the extracted factors and whether or not the student had been injured or involved in serious accidents. These correlations must be interpreted cautiously because of the magnitude of the correlation. In general, students who had more positive safety attitudes were less likely to report they had been injured or involved in serious accidents. Also, students who perceive their teacher to be safety conscious were less likely to report injury or involvement in serious accidents.

Conversely, those who had been injured or involved in serious accidents perceived their teacher to be careless. Students who were not injured or involved in serious accidents tended to perceive their parents as safety conscious while students who were injured tended to perceive their parents as careless.

To enhance the understanding of the relationships, multiple regression was employed to discover the amount of variance explained by the factors in combination. For each dependent variable: 1) injured in the agricultural mechanics laboratory; 2) involved in a serious accident at school; and 3) involved in any serious accident, two factors combined to explain more variance in combination than was explained by either factor independently. Good, healthy student safety attitudes were associated with less incidence of injury in the agricultural mechanics laboratory and less involvement in serious school accidents. Teacher carelessness was associated with more incidence of injury in the agricultural mechanics laboratory and more involvement in serious accidents. Parent carelessness was associated with more serious accidents at school and more total serious accidents. However, only 13% of the variance was explained with the strongest multiple regression equation. This means that 87% of the variance remains unexplained.

The safety and well being of students is a primary consideration for all teachers. Anything that can be done to protect the health and safety of students should be done. Only 13% of the variance associated with self-reported injury in the agricultural mechanics laboratory was explained. However two factors were identified that, if addressed, may help the agricultural mechanics student avoid the pain, expense, and inconvenience of injury. Promoting positive safety attitudes for students provides a place to continue in efforts to reduce accidents. Additionally, careless teacher behaviors are problematic in themselves. Students tend to perform skills in the manner in which they are modeled. This research indicates there is a relationship, although low, between teacher carelessness and incidence of injury. Texas agricultural science teachers need more preservice and inservice education in the areas of promoting positive safety attitudes and decreasing teacher carelessness.

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AGRICULTURAL MECHANICS LABORATORY SAFETY: STUDENT ATTITUDES AND PERCEPTIONS

A Critique

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This study is timely, of strategic and tactical importance to the profession, is well planned, reflects adequate research control, describes adequately the research procedures used, and addresses questions about which information is lacking. Planning, conducting, and reporting two related research studies, Agricultural Mechanics Laboratory Safety: Student Attitudes and Perceptions and Relationships Between Student Safety Attitude and Selected Variables results in a multiplier effect for usefulness not often encountered.

What limitations existed in the conduct of this study? What demographic characteristics could have affected the responses by students?

With respect to Factor 5 (Teacher is Careless), would it have been possible to have asked students to give specific examples? How was "serious," as in "serious accidents" defined? This interpretation could have affected the findings. What might be hypothesized as to explanations for the 87% of the variance that was unexplained?

RELATIONSHIPS BETWEEN STUDENT SAFETY ATTITUDE AND SELECTED VARIABLES

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INTRODUCTION AND THEORETICAL FRAMEWORK

Results of a study of agricultural science programs in Texas show that in 239 randomly selected schools, 1449 accidents had occurred (Lawver, 1992). Of the programs studied, one Texas Agricultural Science and Technology teacher reported 13 major accidents during a five-year period. Studies by Bekkum and Hoerner (1993) in Iowa and Silletto (1993) in Nebraska found similar accident rates. Bekkum and Hoerner reported means of 7.70 minor accidents and 0.66 major accidents over a five year period. In Nebraska, Silletto found a mean minor accident rate of 8.58 and a mean major accident rate of 0.75 over a five year period. In a study of agricultural science programs in the state of Virginia, Burke (1989) reported 954 accidents in programs surveyed for a one-year period. Gartin, Maines, and Bean (1993) in a study of West Virginia agricultural science programs, found that 89 responding teachers reported 49 accidents involving equipment commonly found in agricultural mechanics laboratories over a one year period.

Harper (1983), Hard and Miller (1990), Fletcher and Johnson (1990), Bekkum and Hoerner (1993), Hilton and Bruening (1993), Gartin, Maines, and Bean (1993), Gliem, Miller, and Hard (1993) and others have addressed agricultural mechanics laboratory safety and related health risks in recent research efforts. Enforcement of safety regulations is generally left to local school districts and state departments of education. Many agricultural science programs have seen safety standards as a nuisance and an infringement on academic freedom.

The study by Lawver (1992) shows that accident rates are excessive and that safety should be a concern in Texas Agricultural Science Laboratories. By examining relationships between accidents, safety attitudes and perceptions of teachers, and safety attitudes and perceptions of students, we can target intervention efforts more effectively.

PURPOSES AND OBJECTIVES

The purpose of this study was to collect data regarding types and frequencies of accidents that occurred in Texas Agricultural Mechanics Laboratories. In addition, the relationships between accidents, safety attitudes and perceptions of teachers, and safety attitudes and perceptions of students with selected variables was investigated. Specific objectives were as follows: (1) To determine the types and frequencies of accidents that occurred in Texas Agricultural Mechanics Laboratories; (2) To describe the attitudes and perceptions of teachers toward: a) safety practices; b) safety of school laboratories; and c) safety knowledge; (3) To describe the attitudes and perceptions of students toward: a) safety practices; b) safety of school laboratories; and c) safety in their home environment; and (4) To determine relationships between students' safety attitude and selected variables.

METHODS AND PROCEDURES

The target population for this descriptive-relational study was all Texas Agricultural Science and Technology programs for the 1992-1993 academic year and all students enrolled in secondary agricultural mechanics courses during the same period. It was anticipated that there would be approximately 1000 Agricultural Science and Technology programs and 20,000 students who were enrolled in agricultural mechanics courses in Texas for 1992-1993. Due to limited resources, 30 randomly selected programs and the students enrolled in agricultural mechanics in those programs. With intensive follow-up procedures, a return rate of 87% (n=26) was achieved. There were 378 student questionnaires returned.

The teacher questionnaire consisted of four sections. Section one consisted of 29 Likert-type items designed to assess attitudes and perceptions concerning safety behavior, safety knowledge, and safety practices. Section two was designed to collect general information concerning their program such as length of class period, number of students, size of laboratory, number of accidents, etc. Open-ended questions were used for section 2 Eleven yes/no items comprised section 4. The yes/no items were designed to determine teacher safety knowledge concerning specific safety behaviors. Section 4 also asked the teacher to report accidents of varying severity including the nature of the accident and body part(s) involved. Faculty and graduate students reviewed the instrument for face and content validity. The Cronbach's alpha reliability coefficient for section 1 of the questionnaire was 0.98.

The teacher in each of the 30 programs was asked to administer the student questionnaire. The student questionnaire consisted of four sections. Section one contained 20 Likert-type items dealing with attitudes and perceptions about general safety behaviors. Fifteen Likert-type items designed to assess student attitudes and perceptions concerning safety behavior and knowledge of their teacher and general safety condition of the agricultural mechanics laboratory made up section 2. Section 3 was designed to assess attitudes and perceptions concerning parental safety knowledge and behavior and safety conditions of the home. There were 15 Likert-type items in section 3. Section 4 consisted of 5 closed-ended questions about home town, personal involvement in serious accidents, instruction in safety, and personal involvement in accidents in the agricultural mechanics laboratory. Faculty and graduate students reviewed the instrument for face and content validity. The Cronbach's alpha reliability coefficients for sections 1, 2, and 3 were 0.70, 0.76, and 0.89 respectively.

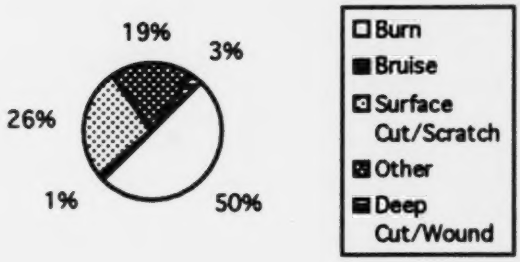
Each program in the sample was contacted by telephone to ascertain willingness to participate in the study. A replacement was randomly selected to replace one program whose teacher was not willing to participate. Number of students eligible to complete the questionnaire was also determined with the phone call. Packets containing the teacher questionnaire, student questionnaires, machine readable forms, and a stamped returned envelope were mailed. After two weeks and three weeks, non-respondents were called to remind them to complete and mail the questionnaires. A replacement package was mailed to one program. Early and late respondents were compared. No significant differences were found.

The data were analyzed using SPSS ® for the Macintosh®. Descriptive statistics such as measures of central tendency and frequencies were used to achieve Objectives one, two, and three. Correlation coefficients were used for Objective four. The magnitude of relationships were interpreted using Davis' conventions. An alpha level of .05 was set a priori.

FINDINGS

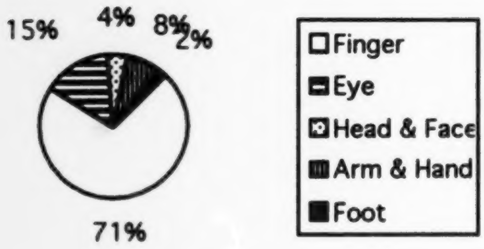
Objective 1. There were 26 agricultural science teachers representing 26 programs who responded to the teacher version of the questionnaire. Teachers were asked to report the number of accidents in their agricultural mechanics laboratory during the 1990-91 and 1991-92 school years. They were further asked to indicate the type of accident. Five types of accidents were possible as defined by this study: 1) injuries requiring only first-aid treatment in the lab; 2) injuries requiring a visit to the school nurse; 3) injuries requiring treatment in physician's office or emergency room; 4) permanent types of injuries (e.g. amputations, paralysis, etc.); and 5) fatalities. No permanent injuries or fatalities were reported. Injuries requiring only first-aid were the most predominately reported with 60 occurrences. There were, on the average, 2.31 occurrences of this type of injury per agricultural mechanics laboratory over the two year period in question. There were as many as 15 occurrences reported by one teacher. Only an average of 0.19 injuries requiring doctor or emergency room treatment were reported per laboratory.

Figure 1 Types of Injuries



The respondents were also asked to indicate the nature of the reported injuries. Teachers had a number of options ranging from "surface cut/scratch" to "asphyxiation." Figure 1 shows that burns were the most commonly occurring injury (50%, n=34). Surface cuts and scratches were the next most common injury (26%, n=18). The category "other" received 13 (19%) responses. Several respondents indicated that these injuries were splinters that had been received while woodworking.

Figure 2 Body Part Injured.



The body part injured was also of interest in this study. As seen in Figure 2 the majority of injuries involved fingers (72%, n=38). The next most common body part was the eye (15%, n=8) followed by the arm and hand (8%, n=4). There were no reported injuries to the trunk and only one injury to the lower extremity (foot) (2%, n=1).

Objective 2. The second objective of this study was to describe teacher's attitudes and perceptions toward safety practices, laboratory safety, and safety knowledge. The teachers responded to 29 Likert-type items. There was relatively high agreement with items that describe what are considered to be positive safety attitudes and practices and relatively high disagreement with items that describe negative safety attitudes and practices. However, certain practices which are thought to be important by safety experts received relatively low agreement. Table 1 shows that the item "It is important to administer safety exams" received a mean score of 3.64. This can be interpreted that, on the average, the respondents only "agreed" to "strongly agreed" with that item. Another apparent inconsistency was found with the statement, "Safety demonstrations on laboratory equipment are important." The respondents only "strongly agreed" (mean = 4.08) with this statement. Other disturbing attitudes and perceptions dealt with color coding of laboratory tools (mean = 3.24) and equipment (mean = 2.88), posting safety rules and procedures (mean = 3.16), and safety guards (mean = 2.40).

Objective 3. The 26 responding agriculture teachers administered the student version of the questionnaire to 377 secondary agricultural science students who where enrolled in an agricultural mechanics course. Table 2 shows the rank order listing of the 30 Likert-type items that were intended to provide a measure of the student's personal attitudes and perceptions toward safety. The students show relatively high agreement with the statements reflecting positive safety attitudes and behaviors. However, on the statements reflecting negative safety attitudes and behaviors, there were a few items on which the students did not disagree strongly. For instance, the students only "disagreed" (mean 1.93) with the statement "safety guards make things hard to operate. Another statement, "teachers spend too much time teaching safety" only received "disagreement" (mean = 1.77). The negative attitude, "I don't care if my fellow class mate is unsafe" was the lowest ranking item (mean = 0.98) meaning the respondent "strongly disagreed" with the statement.

TABLE 1. Rank order listing items describing teacher attitudes and perceptions toward safety practices, laboratory safety, and safety knowledge **(n = 26).**

Item	Mean[a]	Std. Dev.
I consider safety to be important	4.92	0.28
It is important to know how to operate laboratory equipment in a safe manner	4.88	0.33
I think student safe behavior is of the utmost importance	4.84	0.37
It is important to know how to operate a table saw in a safe manner	4.84	0.37
It is important to safely handle all materials I use in the laboratory	4.80	0.50
It is important to require students to wear safety glasses	4.80	0.41
It is important to keep power equipment in safe working order	4.76	0.52
I believe safety should be emphasized foremost in laboratory practices	4.72	0.46
I am competent in my knowledge of safety practices	4.56	0.58
It is important to teach electrical safety	4.52	0.65
Enforcing all safety rules and regulations for my program is important	4.52	0.71
It is important to follow recommended ventilation requirements for laboratories	4.32	0.75
Safety devices on equipment should be major factor in the decision to purchase	4.24	0.83
It is important to follow recommended safe lighting levels in the laboratory	4.16	0.99
I generally follow safe practices	4.08	0.86
Safety demonstrations on laboratory equipment are important	4.08	0.91
I should know the Texas safety laws that impact my laboratory	3.96	0.94
Requiring student certification on laboratory equipment is important	3.96	0.98
It is important to follow recommended safe noise levels in the laboratory	3.92	1.00
It is important to administer safety exams	3.64	1.08
Safety decals on laboratory equipment help to prevent accidents	3.32	1.11
Sometimes I am less careful than I should be	3.28	1.02
Knowing how to safety color code laboratory tools is important	3.24	1.27
Written shop safety rules/procedures at each work station help prevent accidents	3.16	1.18
Safety color coding of laboratory equipment prevents accidents	2.88	1.36
Safety guards make things difficult to operate	2.40	0.87
Many times I might teach unsafe practices by example	2.24	1.45
My laboratory tools are sometimes in unsafe operating condition	2.04	1.31
My school laboratory is a hazardous place to work	1.16	1.11

[a] 0=Very Strongly Disagree; 1=Strongly Disagree; 2=Disagree; 3=Agree; 4=Strongly Agree; 5=Very Strongly Agree.

The second section of the student questionnaire asked the students' perception of their teacher's safety behavior and the condition of the agricultural mechanics laboratory. The students "strongly disagreed" (mean = 0.98) that their agricultural mechanics teacher "teaches unsafe practices" (Table 3). Conversely, the students "strongly agreed" (mean = 4.17) that their agricultural mechanics teacher "considers safety to be important."

TABLE 2. Rank order listing of items describing student's attitudes and perceptions toward safety **(n = 377).**

Item	Mean[a]	Std. Dev.
Safety makes sense	4.40	1.03
Safety is important	4.31	1.01
Knowing what to do if an emergency happens is important	4.25	1.16
Everyone should follow safety rules	4.24	1.06
Safety rules are a good idea	4.08	1.34
Handling chemicals in a safe manner is important	4.02	1.21
Knowledge of hand and power tool safety procedures is important	3.96	1.20
Using correct agricultural mechanics safety practices is important	3.84	1.24
Safety guards make things hard to operate	1.93	1.39
Teachers spend too much time teaching safety	1.77	1.51
There are too many safety rules	1.75	1.41
Safety rules make things hard to operate	1.74	1.35
Safety does not interest me	1.23	1.43
Safety is for beginners only	1.22	1.44
Safety education is a waste of time	1.19	1.36
Safety is for schools, not businesses	1.13	1.32
Using personal safety equipment is a waste of time	1.10	1.35
Safety does not benefit the student	1.07	1.33
Safety is not my responsibility	1.00	1.39
I don't care if my fellow class mate is unsafe	0.98	1.30

[a] 0=Very Strongly Disagree; 1=Strongly Disagree; 2=Disagree; 3=Agree; 4=Strongly Agree; 5=Very Strongly Agree.

TABLE 3. Rank order listing of items describing student's perceptions toward their teacher's safety behavior and laboratory conditions **(n = 377).**

Item	Mean[a]	Std. Dev.
My Agricultural Mechanics Teacher · · · ·		
considers safety to be important	4.17	1.17
stresses safe student behavior	4.00	1.16
knows how to operate power tools in a safe manner	4.04	1.10
knows how operate machinery in a safe manner	3.92	1.23
puts safety first	3.91	1.18
knows how to handle materials in a safe manner	3.91	1.20
follows safe practices	3.90	1.21
sometimes does unsafe things in the laboratory	1.61	1.10
knows little about safety practices	1.17	1.43
is careless	1.09	1.49
teaches unsafe practices	0.98	1.28
My school's laboratory · · · ·		
power equipment is kept in safe working condition	3.54	1.27
tools are safety color coded	2.94	1.46
tools are sometimes in an unsafe working condition	2.01	1.45
is a dangerous place to work	1.54	1.57

[a] 0=Very Strongly Disagree; 1=Strongly Disagree; 2=Disagree; 3=Agree; 4=Strongly Agree; 5=Very Strongly Agree.

The third section of the student questionnaire dealt with student's perceptions of their parents' safety attitude and the condition of their home environment concerning safety. The students tended to agree with positive statements describing their parent's safety attitude and the condition of their home environment and to disagree with negative statements. In general, however, the mean scores indicated that the agreement and disagreement tended to be not as strong as was achieved on the previous two sections of the questionnaire. Table 4 shows that on the statement, "my parents are sometimes careless," the mean (2.43) fell near the middle of the scale indicating neither agreement nor disagreement.

Objective 4. A student safety attitude score was computed by recoding the negatively worded statements. The sum was used to find the score for each student. This student safety attitude score was then used to find relationships with various variables. Table 5 shows those relationships. For the first relationship, the mean student safety attitude score for each school was computed. This mean student safety attitude score by school was compared with the teacher safety attitude score by school. A Pearson product-moment correlation coefficient of .16 was found. This relationship was not statistically significant and showed only a low association. Substantial association was found with three of the selected variables. Student perception of teacher safety attitude (r = .65), student perception of total parent safety score (r = .54), and student perception of parent's safety knowledge (r = .50) were all statistically significant at the .01 level. Moderate associations were found with student perception of parent's safety attitude (r = .49) and student perception of the home safety environment (r = .45).

Section four of the student questionnaire asked respondents to indicate whether or not they had ever had an injury in the agricultural mechanics laboratory. They were also asked to indicate whether they had ever had involvement in a serious accident of any kind. Fifty student respondents (13.2%) indicated that they had been injured in the agricultural mechanics laboratory. One-hundred-seventy-four (46.1%) indicated that they had never been involved in a serious accident of any kind. Table 5 shows the association of having been injured in the agricultural mechanics laboratory or having been involved in a serious accident. The point-biserial correlation coefficient for "student injury in agricultural mechanics laboratory" (r = .28) shows low positive association. Students who had been injured tended to have better student safety attitude scores than those who had not been injured.

TABLE 4. Rank order listing of items describing student's attitudes and perceptions toward their parent's safety behavior and home environment.

Item	Mean[a]	Std. Dev.
My parents · · · ·		
know how to drive a car safely	3.86	1.31
know what to do in case of an emergency	3.77	1.36
consider safety to be important	3.75	1.26
know how to operate equipment in a safe manner	3.45	1.32
know how to handle dangerous substances	3.45	1.25
follow safety practices	3.52	1.23
put safety first	3.41	1.26
are sometimes careless	2.43	1.36
don't always follow safety warnings	2.27	1.34
have little knowledge of safety practices	1.77	1.54
My family's motor vehicles are in safe working condition	3.78	1.34
My house is safe place to live	3.76	1.32
Flammable materials around my home are stored in a safe manner	3.44	1.32
Emergency phone numbers are kept by the telephone	3.19	1.52
Dangerous materials in my home are stored in an unsafe manner	1.80	1.51

[a] 0=Very Strongly Disagree; 1=Strongly Disagree; 2=Disagree; 3=Agree; 4=Strongly Agree; 5=Very Strongly Agree.

TABLE 5. Relationship of Student Safety Attitude to Selected Variables.

Variable	r	N
Teacher Safety Attitude[a]	.16	26
Student Perception of Teacher Safety Attitude[a]	.65**	377
Student Injury in Agricultural Mechanics Laboratory[b]	.28**	377
Student Involved in Serious Accident[b]	.14**	377
Student Involved in Serious Auto Accident[b]	.06*	377
Student Involved in Serious Job Accident[b]	-.05*	377
Student Involved in Serious Recreation Accident[b]	.05*	377
Student Involved in Serious School Accident[b]	.14**	377
Student Involved in Serious Other Accident[b]	.02	377
Student Perception of Total Parent Safety Score[a]	.54**	377
Student Perception of Parent's Safety Knowledge[a]	.50**	377
Student Perception of Parent's Safety Attitude[a]	.49**	377
Student Perception of Home Safety Environment[a]	.45**	377

* $p \leq .05$

** $p \leq .01$

[a] Pearson product-moment correlation coefficient

[b] Point biserial correlation coefficient

CONCLUSIONS AND RECOMMENDATIONS

It was concluded that the majority of injuries occurring in Texas agricultural mechanics laboratories are minor and are treated in the laboratory. Although no permanent injuries were reported, it is very likely that such injuries did occur. For instance, a student teacher reported an injury involving a power miter box saw where the loss of use of several fingers was the result. This particular agricultural science program was not part of the random sample. It was further concluded that most injuries occurred to the finger and eyes and that most injuries were the result of burns with the next most common injury being surface cuts and scratches.

It can be easily argued that any accident rate in the agricultural mechanics laboratory is excessive. However, accidents are going to occur. Efforts should be directed at minimizing the number of accidents occurring in agricultural mechanics laboratories. Since the primary sites of injuries appears to be fingers and eyes and the primary injury tends to be burns and surface cuts or scratches, current practices need to be altered to better protect the student. There is room for improvement.

In general, the teachers who responded to this study had healthy attitudes and perceptions toward safety practices, laboratory safety, and safety knowledge with few exceptions. The respondents strongly agreed to very strongly agreed that safety is important and must be addressed in the instructional program along with the use of safety spectacles and other personal protective devices. Certain recommended safety practices were not as highly ranked. For instance, most, if not all, teacher education programs for agricultural education highly recommend the use of safety demonstrations to teach the safe operation of tools and equipment in the agricultural mechanics laboratory. When the items were rank ordered, this practice appeared well down the list. Items such as the use of safety exams, safety decals, safety color coding, and posting of operating rules and regulations appeared at the bottom of the positively worded safety practices as well. Do these practices make a difference in accident rates? If they do make a difference, efforts should be targeted toward universal usage. Given that the health and welfare of students is at stake, it should be assumed that these practices do make a difference until proven otherwise.

It was concluded that the 377 students who participated in this study had healthy attitudes and perceptions concerning safety in the agricultural mechanics laboratory. They did tend to indicate that safety guards on equipment is inconvenient because of their response to the item concerning the statement "safety guards make things hard to operate." Also indicated was a belief that there are too many safety rules and that teachers spend too much time teaching safety. Teachers should strive to keep safety guards installed and to make sure that when teaching safety that students understand the necessity.

It was further concluded that students perceive their agricultural science teacher to have positive safety attitudes. The students did perceive, however, that their teacher sometimes did unsafe things in the laboratory. Students also indicated that they perceive the laboratory to have some deficiencies in the areas of color coding and tools which are in unsafe working condition. Teachers need to understand that they are under constant observation by their students. Although students may recognize a particular activity is unsafe, they may be inclined to do the same activity because that behavior was modeled by the teacher. Furthermore, it is problematic when the teacher models unsafe behavior that is not recognized by the student as being unsafe. Due to inexperience, students may not recognize hazardous situations.

Furthermore, students perceived their parents to have positive safety attitudes and their home to be a safe environment. However, they did indicate that their parents were sometimes careless and that they did not always follow safety warnings.

The relationship between teacher safety attitude and student safety attitude was low. Conversely, there was a substantial association between student safety attitude and the student's perception of the teacher's safety attitude. Students who tended to perceive the teacher to have a positive safety attitude tended to have higher student safety attitude. More careful examination of this relationship needs to take place to understand the nature of this association and how this association might affect accident rates. Also, students who reported having been injured in the agricultural mechanics laboratory tended to have higher student safety attitude scores. Could it be that the injury sharpened the safety attitude of the student? This association also needs further study before any conclusions can be drawn about the cause and affect relationship.

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RELATIONSHIPS BETWEEN STUDENT SAFETY ATTITUDE AND SELECTED VARIABLES

A Critique

James E. Christiansen, Texas A&M University

This study is timely, of strategic and tactical importance to the profession, is well planned, reflects adequate research control, describes adequately the research procedures used, and addresses questions about which information is lacking. Planning, conducting, and reporting two related research studies, Agricultural Mechanics Laboratory Safety: Student Attitudes and Perceptions and Relationships Between Student Safety Attitude and Selected Variables results in a multiplier effect for usefulness not often encountered.

What limitations existed in the conduct of this study? What demographic characteristics could have affected the responses by students?

Could this study be replicated, but include also students in cooperative programs placed for occupational experience in the workplace to determine if differences in perceptions occur?

Complete List of Papers Submitted for Consideration at the Thirteenth Annual Western Region Agricultural Education Research Meeting

A Comparison of Learning Styles, Teaching Styles and Personality Types of Preservice Student Teachers at Two Western Universities
Dr. M. Susie Whittington, University of Idaho
Dr. Matt Raven, Montana State University

A Comparison of Minority and Non-Minority Students Enrolled in Advance Secondary Agriscience Courses in Texas
Steve Fraze, Texas Tech University

A Comparison of Undergraduate Major and Preservice Teachers' Performance on a Standardized Subject Assessment Exam; and Technical Competence as Perceived by Master Teachers
Matt Baker, Cal-Poly- Pomona
Seck Malle, Cal-Poly-Pomona

Administrative Approaches to the Management of Concurrent Enrollment Programs
Dr. Haile Hirpa, Utah State University
Dr. Gary S. Straquadine, Utah State University

Agri-Science Equal to Science?
Tony Christian, Agriculture Teacher, Norman, OK
Dr. James P. Key, Oklahoma State University

Agricultural education preparation in western region
Joseph G. Cvancara, Washington State University
Clifford L. Nelson, Washington State University

Agricultural Mechanics Laboratory Safety: Student Attitudes and Perceptions
David E. Lawyer, Texas Tech University

Agricultural Awareness in Arizona
Robert Alan Flood, Pima Community College
Dr. Jack Elliot, The University of Arizona

An Analysis of the Leadership Styles of Selected FFA Members and Their Advisors
Darla Washington, Stephen F. Austin State University
Dale Perritt, Stephen F. Austin State University
Sandra McCune, Stephen F.Austin State University
Donice McCune, Stephen F.Austin State University

Are Agricultural Educators Blind, Deaf, and Dumb Regarding Global Competence?
Douglas A. Pals, University of Idaho

Assessment of Cognitive Level of Instruction, Aspiration and Attitude Toward Higher Level Instruction
M. Susie Whittington, University of Idaho
Gretchen L. Bowman, University of Idaho

Developing a Scale to Research and Evaluate Youth Leadership Life Skills Development
Brenda S. Seevers, New Mexico State University
J. Thomas, New Mexico State University
Dennis L. Clason, New Mexico State University

Enrollment Changes in Idaho Agricultural Science and Technology Programs Which Occurred After Program Delivery Changes
John P. Mundt, University of Idaho
Stuart D. Nesbitt, Agriculture Instructor, Weiser, ID.

Examining the Learning Styles of Students in a College of Agriculture
Robert Torres, New Mexico State University
Jamie Cano, Ohio State University

Examining The Cognitive Abilities of Students Enrolled in a College Of Agriculture
Robert M. Torres, New Mexico State University
Jamie Cano, Ohio State University

Follow-up of 1988 and 1992 Agricultural Education Program Completers
Dr. James J. Connors, The University of Arizona
Dr. David E. Cox, The University of Arizona

4-H Youth Participation in Leadership Development Activities: A Tri-State Study
Dr. Brenda S. Seevers, New Mexico State University
Dr. Thomas J. Dormody, New Mexico State University

Homeowners' attitudes about the use of lawn chemicals
William D. Byrum, Dow Chemical Company
Dr. Jack Elliot, The University of Arizona

How videotape is used by teachers of agricultural sciences in secondary schools
R. Bryan Daniel, Texas Tech University
Robert Terry, Jr., Texas Tech University

Learning and Teaching Styles of Agricultural and Technology Education Teacher Educators and Pre-Service Teachers
Matt R. Raven, Montana State University
Van Shelhamer, Montana State University
Mike Wright, Montana State University

Livestock-related agricultural injuries among Utah livestock producers
Scott R. Williams, Utah State University
Gary S. Straquadine, Utah State University

Magnetic fields in agricultural science laboratories
Dr. Glen M. Miller, The University of Arizona

Participation of FFA Members in Arizona, Colorado, and New Mexico in Leadership Development of Activities
Thomas J. Dormody, New Mexico State University
Brenda S. Seevers, New Mexico State University

Perception of Selected Agricultural Education Administrators Regarding the Enhancement of International Studies and Opportunities for Agricultural Education Students and Faculty
Dr. Michael Stapper, Oklahoma State University
Dr. Eddy Finley, Oklahoma State University

Predicting Youth Leadership Life Skills Development Among FFA Members in Arizona, Colorado , and New Mexico
Thomas J. Dormody, New Mexico State University
Brenda S. Seevers, New Mexico State University

Predicting youth leadership life skills development among senior 4-H members in Arizona, Colorado, and New Mexico
Brenda S. Seevers, New Mexico State University
Thomas J. Dormody, New Mexico State University

Realistic Expectations of Beginning Secondary Agriculture Education Teachers as Perceived by Beginning Secondary Agriculture Teachers and Their Principals in the Western United States
John P. Mundt, University of Idaho
Laurie Stenberg-Nichols, University of Idaho
Troy S. Wright, Agriculture Instructor, New Plymouth, ID.

Relationships Between Student Safety Attitude and Selected Variables
David E. Lawver, Texas Tech University

Status of secondary agricultural education computers and agribusiness software
Dr. Jack Elliot, The University of Arizona
Dr. James Connors, The University of Arizona
Jim Schug, Midwest Agribusiness Services, Inc.
Paula Wright, The University of Arizona

Strategies for Improving Agricultural Literacy and Science Process Skills of Urban Fifth and Sixth Graders in the Los Angeles Unified School District
Rachel Mabie, Cal-Poly-Pomona
Matt Baker, Cal-Poly- Pomona

Taking the pulse of the College of Agricultural Sciences: perceptions of undergraduate students
David Whaley, Colorado State University
James C. Heird, Colorado State University
James Pritchett, Colorado State University

Teacher's Perceptions of SAE Programs and Benefits for Students with Special Needs in Oklahoma
Dr. James D. White, Oklahoma State University
Tony Schwager, Oklahoma State University

Traumatic Agricultural Injuries in Utah
Gary S. Straquadine, Utah State University
Thomas E Niederee, Utah State University
Scott R. Williams, Utah State University

Understanding and Perceptions About Agriculture of Television News Reporters
Robert Terry Jr., Texas Tech University

Validation of the California agricultural literacy framework
James G. Leising, University of California-Davis
Eric Zilbert, University of California-Davis